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LOYOLA UNIVERSITY CHICAGO

MOTHERS' NONSTANDARD WORK SCHEDULES AND  
YOUNG CHILDREN'S SCHOOL READINESS

A DISSERTATION SUBMITTED TO  
THE FACULTY OF THE GRADUATE SCHOOL  
IN CANDIDACY FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY

PROGRAM IN DEVELOPMENTAL PSYCHOLOGY

BY

KELLY B. HAAS

CHICAGO, ILLINOIS

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For my parents

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## CHAPTER ONE

### INTRODUCTION

Over the last several decades, labor force participation among mothers with young children has grown substantially (U.S. Department of Labor, 2011). As the United States moves toward a 24/7 global economy, a growing share of these mothers are employed at nonstandard times (Presser, 2003). In contrast to a more traditional, standard-day work schedule, nonstandard hours involve non-day (e.g., evening and night shifts) and irregular (e.g., rotating shifts that involve alternating evening and night shifts) schedules. As of 2004, about 800,000 mothers with children under the age of six were employed full-time in a nonstandard work arrangement, and labor projections estimate these numbers will likely rise in the future (Presser, 2003; U.S. Department of Labor, 2005). As the number of children whose mothers work during nonstandard hours grows, understanding the influence of such work schedules on young children's well-being becomes increasingly important.

Strikingly, despite the significant number of mothers working a nonstandard schedule, relatively few studies have considered how the temporal structure of mothers' work experiences may relate to children's outcomes. To address this gap in the literature, the current study first considered whether there were any associations between specific types of nonstandard work schedules and preschoolers' early academic skills and externalizing problems. Next, this study examined whether these linkages were universal

or if they varied by mothers' job and family characteristics. Specifically, in terms of job characteristics, the moderating role of mothers' work hours was investigated, and at the level of the family, family structure was also evaluated. Finally, to further our understanding of what mechanisms may explain the relation between specific types of work hours and children's school readiness, the mediating roles of mothers' depressive symptoms and positive parenting practices (i.e., cognitive stimulation and emotional supportiveness) were tested. This dissertation drew data from the *Early Childhood Longitudinal Study – Birth Cohort* (ECLS-B), a nationally-representative sample that includes children aged three to five years-old.

### **Mothers' Employment**

Following the influx of mothers into the workforce over the past several decades, understanding the intersection between work and family has become increasingly important. In response to this, the associations between mothers' employment status (i.e., employed versus unemployed) and children's development have been extensively studied across multiple disciplines (for reviews see Brooks-Gunn, Han, & Waldfogel, 2010; Korenman & Kaestner, 2005; Ruhm, 2009; Smolensky & Gootman, 2003). Overall, evidence from the existing maternal employment literature lacks consensus regarding its relation to children's well-being. Studies have reported a few positive associations (Vandell & Ramanan, 1992; Moore & Driscoll, 1997), some negative associations (Baydar & Brooks-Gunn, 1991; Belsky & Eggebeen, 1991; Ruhm, 2004), as well as varied results depending upon the timing of work and specific characteristics, such as mothers' work hours (Berger, Hill, & Waldfogel, 2005; Han, Waldfogel, & Brooks-

Gunn, 2001; Hill, Waldfogel, Brooks-Gunn, & Han, 2005; James-Burdumy, 2005; Waldfogel, Han, & Brooks-Gunn, 2002).

One reason for the inconclusive nature of these findings may reflect the tendency of the existing studies to limit their operationalization of mothers' work experiences to whether or not mothers were employed. Work-family scholars have cautioned that such an approach may limit estimates of the effects of early maternal employment on children's development, and instead encourage researchers to take a more nuanced approach (Lambert, 1990; Perry-Jenkins, Repetti, & Crouter, 2000). In other words, rather than focusing solely on whether or not mothers are working, a key future direction for maternal employment research is consideration of the complexity of mothers' work experiences.

For example, Perry-Jenkins and colleagues (2000) have called for researchers to differentiate between the objective characteristics of mothers' work (e.g., nonstandard work hours) and their subsequent, subjective experience of those characteristics (e.g., negative work-to-family spillover and psychological distress). In particular, it is necessary to consider the objective characteristics of employment given that certain aspects of work are likely to be more difficult than others to integrate with family life (e.g., irregular work shifts and long hours). One particularly relevant characteristic of mothers' work in the difficult economy of late is their employment in nonstandard work schedules (Edgell, Ammons, & Dahlin, 2012).

## **Nonstandard Work Schedules**

Historically, working during nonstandard hours has not always been as common as it is in contemporary society. After the implementation of the Fair Labor Standards Act of 1938, the traditional 40-hour-work-week became the norm in the United States (Grossman, 1978). However, by the 1950s, Americans began moving toward a 24-hour, 7-day-a-week economy. This redistribution of the *timing* of adults' work hours represents a significant social phenomenon. Advances in technology, increased access to global markets, growth in the services sector, and labor market deregulation have all contributed to this radical restructuring of the modern workforce (Sparks, Faragher, & Cooper, 2001). Moreover, the increased job insecurity, lower wages, and reduced employer benefits of the recent economic downturn have limited many Americans' choice in where, how, and perhaps most importantly, *when* they work (Edgell et al., 2012).

### **Definition of Nonstandard Work Schedules**

This dissertation conceptualized work schedules in a number of ways. First, work schedules reflect the time of day that employees work, and fall into 3 categories: 1) standard-daytime schedules, 2) non-day schedules, and 3) irregular work schedules. Currently, the most reliable source for national data on work schedules is the "Work Schedules and Work At Home" supplement to the Current Population Survey (CPS), which is conducted by the U.S. Census Bureau for the Bureau of Labor Statistics and was most recently released in 2004. The CPS, as well as many large-scale national studies like the ECLS-B, defines a standard-daytime schedule as one in which the majority of

hours worked regularly took place between 6 A.M. and 6 P.M. Non-day schedules refer to those in which the majority of hours regularly worked took place during the evening (i.e., between 2 P.M. and midnight) or the night (i.e., between 9 P.M. and 8 A.M.). Finally, those schedules classified as irregular include rotating shifts, or those in which the work hours vary or change periodically.

Second, work schedules also refer to whether the time of day that employees spend at work changes within a given week. When these schedules do not change, they are considered fixed. Here, two types of fixed schedules are examined: 1) fixed, standard-day schedules, where employees typically work regular day hours five days week, and 2) fixed, non-day schedules, where employees work evening or night hours consistently throughout the week. Lastly, employees working irregular, rotating shifts are thought of as non-fixed because of the changing nature of the timing of work within a given week. In sum, this study conceptualized work schedules as belonging to 3 categories: 1) fixed, standard-day schedules, 2) fixed, non-day schedules, and 3) non-fixed, irregular schedules.

### **Prevalence of Nonstandard Work Schedules in the U.S.**

Descriptive data on these various types of work schedules and patterns are not available at the national level. However, we do know that according to the U.S. Census Bureau, nearly 15 million full-time employed citizens in the United States worked a nonstandard schedule as of 2004 (McMenamin, 2007; U.S. Department of Labor, 2005). With regard to women working full-time, estimates indicate that more than 5 million were employed during a nonstandard time. Furthermore, among those women, nearly 1



million of them were mothers caring for children under the age of six (U.S. Department of Labor, 2005).

While the CPS “Work Schedules and Work At Home” supplement released less data for part-time workers, estimates indicate that nonstandard schedules are even more common among part-time employees (Beers, 2000). Further, given that part-time work is more common among women than men, it is likely that a significant number of mothers with young children are employed in a nonstandard schedule at least part-time (U.S. Department of Labor, 2011). As such, there is a growing need to better understand how these types of work schedules may potentially relate to young children’s well-being.

### **Nonstandard Work Schedules and Mothers’ Well-Being**

#### **Theoretical Framework**

Mothers’ nonstandard work schedules may be linked to children’s development via their effects on mothers’ own well-being, which in turn may influence young children’s school readiness. A useful framework for understanding how particular work experiences may influence those aspects of mothers’ well-being and in turn their family life is found in the work spillover literature (Crouter, 1984; Staines, 1980). According to the spillover model, individuals’ experiences at work influence their emotions, moods, stress, and behaviors which are then carried over into their family lives (Belsky, Perry-Jenkins, & Crouter, 1985; Crouter, Bumpus, Maguire, & McHale, 1999; Frone, Yardley, & Markel, 1997; Galambos, Sears, Almeida, & Kolaric, 1995; Lambert, 1990; Repetti, 1987; Stewart & Barling, 1996). Though the framework can be conceptualized as negative spillover from work to family, as well as the related but distinct spillover from

family to work, evidence indicates the former is more common (Staines, 1980).

Additionally, while spillover can be positive or negative, this study drew from the existing maternal employment literature which suggests that negative work experiences may result in decreased individual well-being that “spills over” into family functioning (Perry-Jenkins et al., 2000).

### **Literature Review**

Empirical support for spillover theory is drawn from studies which have found positive associations between individuals’ experience of negative work-family spillover and depressive symptoms (Barnett & Brennan, 1995; Franche et al., 2006; Goodman & Crouter, 2009). With respect to the nonstandard work literature, Grosswald (2003) provided evidence indicating that particular types of nonstandard shifts were associated with higher levels of work-family spillover as compared with other shifts. That is, employees who worked a rotating, irregular shift were found to be particularly at risk for work-family conflict as compared to those working a non-day shift (e.g., evening or night). This suggests that there may be something especially difficult about managing a rotating, irregular work schedule. However, much of the existing nonstandard work literature collapses different types of nonstandard workers (i.e., those employees who work evening, night, or rotating schedules) into a single category, and compares them to standard-day workers. Next, the nonstandard work literature is reviewed.

## **Nonstandard Work and Mothers' Physiological, Psychological, and Social Well-Being**

A fairly large body of research has detailed the various health concerns associated with employment in nonstandard work arrangements. Collectively, research on nonstandard work schedules indicates that these work schedules represent a negative work experience because they are linked to a variety of physiological, psychological, and social/family adjustment problems (Barton, 1994; Fenwick & Tausig, 2001). Importantly, each of these broad categories is interrelated with the others, meaning that problems in one area are likely to result in problems in another (Srivastava, 2010).

A number of previous studies have linked the disruption of circadian rhythms and sleeping/eating patterns to a variety of physiological and psychological complaints among nonstandard workers (Åkerstedt, 1990; Bohle & Tilley, 1990; Sack, Auckley, Auger, Carskadon, Wright, Vitello, & Zhdanova, 2007). In particular, employees working a nonstandard shift are at heightened risk for cardiovascular disease, hypertension, and gastrointestinal disorders (Boggild & Knutsson, 1999; Gold, Rogacz, Bock, Tosteson, Baum, Speizer, & Czeisler, 1992; Knutsson, Åkerstedt, Jonsson, & Orth-Gomer, 1986; Morikawa et al., 1999). Along with these physiological concerns, nonstandard shift schedules have been positively associated with individuals' psychological well-being, mainly in the form of increased depressive symptoms (Costa, 1996, 2003; Knutsson, 2003).

Moreover, the negative effects of nonstandard work schedules are not limited to physical and mental well-being, but also extend to individuals' social and family lives as

well (Staines & Pleck, 1983). In comparison to those who work standard, daytime schedules, nonstandard workers are frequently "out-of-sync" with family and friends' social activities that are generally scheduled during leisure time in the evenings or nights (Hertz & Charlton, 1989; Liu, Wang, Keesler, & Schneider, 2011). Further, when nonstandard workers are free to engage with family and friends, their irregular sleep patterns often lead to a lack of energy, which may make it difficult for them to interact positively with their spouses and children (Presser, 2003; Staines & Pleck, 1986). Taken together, the research on nonstandard workers' limited opportunities to engage in social interaction suggests that it creates additional burdens and strains (e.g., depressive symptoms) that spill over into the overall functioning of families (Daniel, Grzywacz, Leerkes, Tucker, & Han, 2009; Staines & Pleck, 1986).

In contrast, there are reasons to believe that maintaining a nonstandard work schedule could contribute positively to mothers' well-being, particularly when nonstandard schedules are voluntarily chosen or workers have some level of control over their schedules (Fenwick & Tausig, 2001). If a nonstandard work schedule is freely chosen on the expectation of a reward in the form of a higher hourly wage, the financial incentive may buffer against the negative effects of the nonstandard schedule (Liu et al., 2011). This is consistent with existing research in which increased financial resources have been found to promote parental well-being (Conger, Ge, Elder, Lorenz, & Simons, 1994; Conger, Wallace, Sun, Simons, McLoyd, & Brody, 2002). However, there is little empirical evidence suggesting that pay is, on average, higher for working nonstandard hours than for working daytime hours (Kostiuk, 1990; Schumacher & Hirsch, 1997;

Presser, 2003). Furthermore, evidence suggests that a minority of mothers are choosing to work a nonstandard schedule. Among a national sample, only 11% of employees reported "personal preference" as their reason for working in a nonstandard arrangement (McMenamin, 2007). Thus, it may be that nonstandard work schedules represent an overall negative work experience for many mothers.

### **Mothers' Nonstandard Work Schedules and Young Children's Development**

Despite the risks posed to mothers' well-being by their employment in a nonstandard work schedule, existing research has paid relatively little attention to the ways in which preschoolers' development may be shaped by the time of day that mothers work. This is particularly striking given that scholars acknowledge that the parent-child relationship is the most primary, proximal context of development during early childhood (Bronfenbrenner & Morris, 2006; Sroufe, 1983). Furthermore, the broader maternal employment literature also points to the relevance of mothers' work experiences for young children's well-being. Indeed, a number of studies have reported modest, negative associations between mothers' employment during children's first year of life and preschool-aged children's cognitive and behavioral development (e.g., Berger et al., 2005; Brooks-Gunn et al., 2010; Hill et al., 2005; Ruhm, 2004, 2009).

Of the limited number of studies that have specifically considered the link between mothers' *nonstandard* work experiences and young children's well-being, a majority have found that such work schedules are modestly and negatively related to children's development (e.g., Han, 2005, 2006; Hsueh & Yoshikawa, 2007; Joshi & Bogen, 2007; Rosenbaum & Morett, 2009; Strazdins, Clements, Korda, Broom, &

D'Souza, 2006). For example, as compared to children whose mothers work a standard-day schedule, children of mothers employed at nonstandard times tend to score lower on tests of cognitive achievement (Han, 2005), and they also tend to exhibit more externalizing behavior problems (Joshi & Bogen, 2007). However, existing research has not examined which types of work schedules may be more or less detrimental for preschool-aged children. Since preschool-aged children's emergent academic and behavioral skills are predictive of their later academic achievement, understanding how mothers' nonstandard work may be linked to individual differences in children's school readiness represents an important avenue of research (Blair & Razza, 2007; Duncan et al., 2007; Hinshaw, 1992).

### **Young Children's School Readiness**

Preschool-aged children's readiness for school is largely shaped by differences in their early childhood experiences (Magnuson, Meyers, Ruhm, & Waldfogel, 2004). As such, mothers' employment at nonstandard times may be especially salient for young children given the vast array of skills and capabilities that rapidly develop during the early years of children's lives (Shonkoff & Phillips, 2000). In particular, the preschool years represent a fundamental developmental period during which children must acquire new and complex cognitive skills, such as mental representation (Goswami, 2011; McCartney & Phillips, 2008), as well as the ability to successfully navigate a host of new social challenges (Rose-Krasnor & Denham, 2009).

During early childhood, preschoolers are particularly dependent on their parents for care, support, and protection, relative to older children (Pettit, Bates, & Dodge, 1997).

Not yet independent, children at this age rely on their parents to scaffold them to a point where they can capably accomplish the central developmental tasks of early childhood (Vygotsky, 1978). For instance, mothers may verbally prompt and guide their young children to further their understanding of the sequence of numbers and counting principles (Assel, Landry, Swank, Smith, & Steelman, 2003; Smith, Landry & Swank, 2000). Similarly, young children rely on their parents for help in when to express their emotions and how to do so most appropriately (Bandon, Calkins, & Keane, 2010; Rothbart, Sheese, Rueda, & Posner, 2011).

With regard to this study's focus on school readiness, in particular, existing theory and research indicate that strong academic and behavioral skills place children at an advantageous starting point and ease their transition into formal schooling (Cunha, Heckman, Lochner, & Masterov, 2005; Duncan et al., 2007; Entwisle, Alexander, & Olson, 2005). In light of these findings, it is important to identify factors that may be related to the development of such skills among preschool-aged children so as to better inform efforts to improve school readiness (Ackerman, Izard, Koback, Brown, & Smith, 2007). This dissertation defines young children's school readiness as higher scores on tests of early reading and mathematics skills and fewer externalizing behavior problems.

**Preschoolers' early reading skills.** The development of reading and writing skills during early childhood represents a critical achievement for children growing up in a literate society (Lonigan, Burgess, & Anthony, 2000; Lonigan, Farver, Phillips, & Clancy-Menchetti, 2011). In particular, the preschool years have been identified as a developmental period during which key emergent reading skills typically develop

(Lonigan, Schatschneider, & Westberg, 2008; Whitehurst & Lonigan, 1998).

Collectively, these early reading skills include the domains of: 1) oral language (e.g., letter-sound knowledge), 2) print knowledge (e.g., print conventions), and 3) phonological awareness (Lonigan et al., 2000, 2008, 2011; Wagner, Torgesen, & Rashotte, 1994; Wagner, Torgesen, Rashotte, & Hecht, 1997).

Children's letter-sound knowledge refers to their understanding of the names of letters and their corresponding sounds (Whitehurst & Lonigan, 1998). Print knowledge includes aspects of letter knowledge, but it also covers the set of conventions by which books are constructed. For example, among English-speakers, print conventions include the left-right and top-bottom direction of print on the pages (Clay, 1979; Morrison, Bachman, & Connor, 2005; Tunmer, Herriman, & Nesdale, 1988; Whitehurst & Lonigan, 1998). Finally, phonological awareness refers to the ability to distinguish and manipulate the sound units that make up speech, independent of the words' meaning (Phillips, Clancy-Menchetti, & Lonigan, 2008). A growing research base indicates that normative development of phonological awareness skills begins in the preschool years, with children recognizing different sounds in speech (Anthony, Lonigan, Burgess, Driscoll, Phillips, & Cantor, 2002; Anthony, Lonigan, Driscoll, Phillips, & Burgess, 2003).

**Preschoolers' early mathematics skills.** Compared to the literature available on young children's early reading skills, far less attention has been given to early mathematics skills. This is striking given that a sound mathematical foundation is critical for the development of broader cognitive skills such as problem-solving (Baroody, 2003; Ferrari & Sternberg, 1998; Hiebert & Wearne, 1996). Broadly, young children's



emergent mathematical abilities are made up of three major content areas: 1) number and operations, 2) geometry and pattern recognition, and 3) measurement (Aunola, Leskinen, Lerkkanen, & Nurmi, 2004; Bodovski & Farkas, 2007; Clements, Wilson, & Sarama, 2004; Clements & Sarama, 2004, 2007; Ginsburg & Ertle, 2008). Number and operations include counting ability, which broadly refers to children's knowledge of the sequence of numbers, enumerating objects, number recognition, and counting principles (Geary, Hoard, & Hamson, 1999; Gelman & Gallistel, 1978). Number and operations also include children's understanding of comparing quantities, ordering numbers, adding, and subtracting.

Children's understanding of geometry and spatial sense includes identifying shapes and describing spatial relationships (Clements et al., 2004). During early childhood, children discover various shapes in their surrounding environment and begin to identify and distinguish circles, triangles, and rectangles by their appearance (Clements & Battista, 1992). They also describe objects' locations by using words like *under* and *behind* (Clements & Sarama, 2009). Lastly, the concept of measurement involves young children's recognition of the quantitative aspects of objects, such as whether something is heavy or light (Clements & Stephan, 2004). Further, they begin to compare objects based on these measureable qualities and even use them as a characteristic by which objects may be sorted (Clements & Sarama, 2009). For example, by the age of three, children understand that if they start out with some amount of clay and are then given more, they now have more clay than they originally did (Clements & Sarama, 2009).

**Early academic skills among children of working mothers.** Children's cognitive development, including their reading and mathematics skills, has been widely studied in terms of their relation to mothers' employment. Notably, many of the existing studies used data from the National Longitudinal Survey of Youth (NLSY), a large-scale survey that included comprehensive information about mothers' employment during the early years of their children's lives. Collectively, the results from these existing studies vary, with a couple of the studies reporting positive effects (Moore & Driscoll, 1997; Vandell & Ramanan, 1992), while others found a negative relation (Leibowitz, 1977; Stafford, 1987; Mott, 1991). The majority of studies concluded that there was modest evidence of an overall negative linkage between mothers' employment and children's cognitive well-being that differed depending on the whether mothers worked during children's first year of life or the particular group of children considered in the analyses (Baydar & Brooks-Gunn, 1991; Blau & Grossberg, 1992; Desai, Chase-Lansdale, & Michael, 1989; Greenstein, 1995; Parcel & Menaghan, 1994).

More recently, scholars have argued that these findings should be interpreted with caution as many of the earlier studies utilized less sophisticated analytical methodology that may have underestimated the effects of maternal employment (Ruhm, 2009). The studies published in the last decade, on the other hand, built upon this seminal, earlier work by using more advanced statistical techniques and controlling for potentially confounding factors, thereby reducing the threat of omitted variable bias. Among the more recently published research, a general consensus has emerged, indicating that mothers' employment during children's first year of life was adversely associated with

three and four year-old children's verbal ability as measured by their scores on the Peabody Picture Vocabulary Test (PPVT) (Berger et al., 2005; Han et al., 2001; Hill et al., 2005; James-Burdumy, 2005; Waldfogel et al., 2002). Similarly, negative links were found between mothers' first-year employment and children's early reading and mathematics skills as assessed by their performance on the Peabody Individual Achievement Test (PIAT) (Han et al., 2001; Hill et al., 2005; James-Burdumy, 2005; Waldfogel et al., 2002).

Other studies using data from the National Institute for Child Health and Human Development's (NICHD) Study of Early Child Care and Youth Development (SECCYD) provide additional support for the negative relation between early maternal employment and young children's cognitive development. For instance, Brooks-Gunn and colleagues (2002) reported that mothers' early employment was negatively associated with three year-old children's scores on the Bracken School Readiness Scale. In a follow-up study, the same authors found that the deleterious influence of maternal employment persisted in terms of children's lower scores on the Preschool Language Scale (PLS) and Woodcock-Johnson Language Skills and Applied Problems subtests at age four years-old (Brooks-Gunn et al., 2010).

With regard to mothers' *nonstandard* work, the existing literature is far more limited. Heymann (2000), using data from the NLSY, found that school-age children's reading and mathematics skills as assessed by the PIAT were lower for those children whose parents worked a nonstandard shift. Additionally, Han (2005) used data from the NICHD SECCYD to investigate whether the timing and duration of mothers'

employment in a nonstandard schedule was associated with children's cognitive skills across the first three years of life. Results indicated that the most deleterious effects were found for children whose mothers worked some form of a nonstandard schedule continuously across children's first three years. Specifically, mothers' continuous, stable employment in a nonstandard schedule was negatively related to children's scores on the Bayley Mental Development Index (MDI) at 15 and 24 months, as well as their language skills as measured by their scores on the Reynell Verbal Comprehension and Expressive Language subscales at 36 months.

To date, only two existing studies have compared different types of nonstandard work schedules in terms of their association with school-aged children and adolescents' cognitive skills (Han & Fox, 2011; Hsueh & Yoshikawa, 2007). Using data from the NLSY, Han and Fox (2011) compared reading and mathematics trajectories of children between ages 6-14 years-old, reporting that having a mother who worked more years in a night shift was associated with lower scores on the reading and mathematics subtests of the PIAT, as compared to those whose mothers worked more years at a variable (i.e., rotating) work schedule. In contrast, Hsueh and Yoshikawa (2007) found that mothers' employment in an irregular schedule (as opposed to non-day shifts) was more negatively associated with school-aged children's engagement and performance in school, as measured by the Academic subscale of the Social Skills Rating System (SSRS). One reason for the discrepancy between these findings may be that the NLSY data was collected 30 years ago, during a time when rotating work schedules were far less common (Presser, 2003). Although irregular, rotating shifts have become far more

common recently (Presser, 2003), no one has looked at the link between different types of work schedules and preschoolers' early reading and mathematics skills.

**Preschoolers' externalizing behavior problems.** In addition to preschoolers' early academic skills, children's behavioral problems have received a great deal of attention in the developmental literature (Campbell, 1995, 2006). Externalizing behavior problems, characterized by aggressive, disruptive, and oppositional behaviors (Hill, Degnan, Calkins, & Keane, 2006), are often recognized as problems of *undercontrol* (Achenbach & Edelbrock, 1978; Achenbach & Rescorla, 2000), where children struggle with the skills and abilities associated with behavioral self-regulation (Calkins, Gill, & Williford, 1999; Campbell, 1995, 2006). For many children, these defiant and impulsive behaviors represent a normative developmental stage that is expected to decline as they become better able to manage their emotions, and as they acquire the skills necessary to respond to challenging events in appropriate ways (Coie & Dodge, 1998; Hartup, 1996; Tremblay, 2000).

Some children, however, will continue to have problems into middle childhood and adolescence (e.g., Moffitt, 1990; Pierce, Ewing, & Campbell, 1999). At particular risk are those young children who show relatively high levels of these behaviors in early childhood and those children living in the context of family risk, such as a single-parent household (Campbell, 1997; Greenberg, Speltz, & DeKlyen, 1993; Moffitt, 1990; Shaw, Gilliom, & Giovannelli, 2000; Gutman, Sameroff, & Cole, 2003). These later, maladaptive outcomes include conduct disorder, attention deficit/hyperactivity disorder (ADHD), and juvenile delinquency (Campbell, 2006; Campbell & Ewing, 1990; Cohen

& Mendez, 2009; Cummings, Iannotti, & Zahn-Waxler, 1989; Hill et al., 2006; Olweus, 1979; Rose, Rose, & Feldman, 1989). Given the multiple pathways possible, it is important to consider what factors might be predictive of externalizing problems among young children.

### **Externalizing behavior problems among children of working mothers.**

Despite the importance of identifying sources of individual differences in young children's externalizing problems, the maternal employment literature has paid far less attention to children's behavior problems as compared to their cognitive development (Ruhm, 2009). In general, studies drawing data from the NLSY have reported a negative association between mothers' early employment and preschool-aged children's scores on the Behavior Problems Index (Baydar & Brooks-Gunn, 1991; Belsky & Eggebeen, 1991; Berger et al., 2005; Hill et al., 2005). Additional support has been found with data from the NICHD SECCYD. For example, Brooks-Gunn and colleagues (2010) found significant negative associations between mothers' employment during children's first year of life and teacher-reported externalizing problems among four year-olds.

Again turning to mothers' *nonstandard* work, a modest number of studies have consistently identified mothers' nonstandard work as being negatively linked with young children's behavioral development (e.g., Daniel et al., 2009; Joshi & Bogen, 2007; Rosenbaum & Morett, 2009; Strazdins et al., 2004, 2006). Using cross-sectional data from the Canadian version of the NLSY, Strazdins and colleagues (2004, 2006) found that mothers' nonstandard employment was associated with 2- to 11-year-old children's increased behavioral problems as measured by a composite that included items from the

Child Behavior Checklist (CBCL). Similar cross-sectional results were found for preschool-aged children's CBCL-measured behavior problems in a sample drawn from the Welfare, Children, and Families: A Three City Study dataset (Joshi & Bogen, 2007).

Other longitudinal studies have contributed additional evidence in support of these findings. In particular, Daniel and colleagues (2009) found that among a sample of mothers and their two and three year-old children drawn from the NICHD SECCYD, more externalizing problems were reported among children of mothers who worked a nonstandard schedule, as opposed to a standard-day work schedule. Similarly, a study using data from the ECLS-B found increased regulatory problems (e.g., excessive fussiness, sleeping problems) among two year-old children who had at least one parent working a nonstandard schedule (Rosenbaum & Morett, 2009). Further, children were particularly vulnerable to increased behavior problems among families in which mothers, and not fathers, were the ones working the nonstandard shift. Finally, Hsueh and Yoshikawa (2007) compared children's levels of externalizing behavior problems as measured by the Problem Behavior subscale of the SSRS, finding higher levels of teacher-reported problem behavior among children whose mothers worked irregular (as opposed to fixed, non-day) work schedules.

### **Summary of Mothers' Nonstandard Work Schedules and Young Children's School Readiness**

Collectively, the existing work from the broader maternal employment and nonstandard work literatures indicates that mothers' work schedules may be significantly associated with young children's school readiness. Strikingly, despite evidence that

irregular, rotating schedules may be particularly difficult for mothers' own well-being as well as school-age children's well-being (Grosswald, 2003; Hsueh & Yoshikawa, 2009), no existing studies have considered how *specific types of nonstandard work schedules* may relate to *preschoolers'* school readiness. This is surprising given that preschool-aged children may be even more susceptible than older children to their mothers' negative work experiences because of their greater reliance on their mothers for care, protection, and support. As such, this study is the first to test the extent to which individual differences in preschoolers' academic skills and externalizing problems were explained by whether mothers work fixed standard-day schedules, fixed non-day schedules, or non-fixed irregular schedules.

### **The Moderating Roles of Mothers' Job and Family Characteristics**

In addition to considering the overall link between specific types of nonstandard work schedules and children's readiness for school, the second major contribution of this study was to examine whether this association differed across mothers' job and family characteristics. This was motivated in part by spillover theory, as well as the broader maternal employment literature, which has consistently found that links between employment and children's outcomes are rarely uniform, but instead vary across sociodemographic contexts (Brooks-Gunn et al., 2010; Han & Waldfogel, 2009; Ruhm, 2009).

Surprisingly, despite the empirical evidence from the maternal employment literature, few studies considering the link between nonstandard work hours and children's well-being have investigated potential moderating factors. This represents an



important avenue of research as the risk that nonstandard work schedules pose to children's school readiness may be exacerbated for some preschoolers, when mothers face an additional possible risk in the realms of work and family (Daniel et al., 2009). According to spillover theory, factors that may worsen the link between mothers' nonstandard work and children's school readiness are characteristics that would increase the likelihood that the negative experience of working during nonstandard times would carry over into the family sphere.

### **Mothers' Work Hours**

To help address gaps in the literature, this study first considered mothers' work hours as a moderator. Specifically, this study defined work hours as the total number of hours per week mothers worked for pay. Spillover theory suggests that mothers working longer hours are at a heightened risk for negative emotions, behaviors, and attitudes. In turn, as compared to mothers working fewer hours, those employed more hours per week are more likely to see negative emotional experiences carry over into their family lives, where it has the potential to influence their children's well-being. This is supported by substantial empirical evidence linking longer work hours to the increased experience of negative work-to-family spillover (Berg, Kalleberg, & Appelbaum, 2003; Frone et al., 1997; Galinsky, Kim, & Bond, 2001; Grzywacz & Marks, 2000; Thompson, Beauvais, & Lyness, 1999; Voydanoff, 1988; Wharton & Blair-Loy, 2006).

Furthermore, studies of early maternal employment find greater deleterious links between mothers' work and children's cognitive and behavioral outcomes when that work is full-time, or more than 30 hours per week (e.g., Berger et al., 2005; Brooks-Gunn

et al., 2002; Han et al., 2001; Hill et al., 2005; Parcel & Menaghan, 1994; Ruhm, 2004, 2009). For example, a recent study by Brooks-Gunn and colleagues (2010) found that mothers' full-time employment, but not part-time, was associated with children's significantly worse scores on the Preschool Language Scale and subtests of the Woodcock Johnson Achievement and Cognitive Batteries. Results were similar but less consistent for preschoolers' externalizing problems, such that mothers, but not caregivers, reported more behavior problems among children whose mothers worked full-time as compared to part-time.

Collectively, spillover theory and the existing maternal employment literature build a compelling case for the hypothesis that the association between mothers' nonstandard work and children's school readiness may depend on the number of hours mothers work. With respect to women working *nonstandard* schedules, part-time employment is more common, however, a substantial percentage of women are employed in a nonstandard work schedule full-time. The U.S. Census Bureau estimates that nearly 1/3 of women in a nonstandard work arrangement are employed full-time (McMenamin, 2007). Work spillover theory would suggest that the negative emotional spillover experienced by those women working nonstandard hours full-time is even more likely to carry over into the home.

Thus, it may be that working a greater number of hours at a nonstandard schedule is more detrimental to children's well-being than is working fewer nonstandard hours. In light of the theory and research reviewed, it is striking that no existing study of nonstandard work and preschool-aged children's well-being has yet considered this

hypothesis. Therefore, this dissertation contributed to the existing literature by testing mothers' work hours as a moderator of the relation between specific types of work schedules and preschoolers' well-being.

### **Family Structure**

Along with mothers' work hours, this study also investigated whether the association between mothers' nonstandard work and preschoolers' well-being differs by family structure. To do so, this research considered whether parents were married or not, in that families have a greater amount of social and economic resources when mothers are married as opposed to single or cohabiting. This was guided by research focused on mothers' experience of work spillover, which has found that single and cohabiting mothers are more vulnerable to negative work-to-family spillover as compared to their married counterparts (Burden, 1986; Liu et al., 2011; Perry-Jenkins & Gillman, 2000). Generally, scholars attribute this finding to the differential economic and social resources among single, cohabiting, and married mothers (Brown, 2004, 2006; Manning & Lamb, 2003; Sun, 2003; Thomson, Hanson, & McLanahan, 1994).

Regarding families' economic resources, as compared to mothers who are married, single mother households tend to report significantly lower family incomes as seen by their relatively high rate of poverty (Albelda, Himmelweit, & Humphries, 2005; Duncan, Morris, & Rodrigues, 2011). Interestingly, although cohabiting mothers may live in a dual-earner household, cohabiting partners are often reluctant to pool their financial resources (Brines & Joyner, 1999; Manning & Brown, 2003; Waite &

Gallagher, 2000). As a result, cohabiting mothers' economic situations more closely resemble those seen among single mother families.

Similarly, in terms of social resources, married mothers tend to be more advantaged in the sense that the presence of another adult affords the opportunity for shared household and caregiving responsibilities. In this instance, cohabiting mothers' experience is again more similar to single mothers as their partners are less likely to serve as caregivers for their children (Abroms & Goldscheider, 2002). Collectively, when compared with married mothers, the limited financial and social resources typically experienced by single and cohabiting mothers increases their risk for negative spillover and work-family conflict.

Turning to the role of family structure as it relates to children's well-being, the general consensus of the existing research indicates that, on average, children's well-being is higher among married families as compared to single or cohabiting families. Children of married, two-parent families tend to have higher developmental outcomes as compared to children of single parents and cohabiting parents (Brown, 2002, 2004). Furthermore, of the limited number of studies that have considered the well-being of children in cohabiting families, few find significant differences between cohabiting and single families (Brown, 2002, 2004; Dunifon & Kowaleski-Jones, 2002; Hao & Xie, 2002; Manning, 2002; Manning & Lamb, 2003; Morrison & Ritualo, 2000; Thomson et al., 1994).

Thus, the children of mothers who are single or cohabiting and employed during nonstandard hours may be even more at risk than those children whose mothers are

married and work a nonstandard schedule. Overall, women who work in a nonstandard schedule are more likely to be single or cohabiting, however, a significant percentage (nearly 40%) of women employed during nonstandard hours are married (McMenamin, 2007). Despite this, existing research has not tested whether the negative association between nonstandard work and preschoolers' early academic skills and externalizing problems are worse among families with single or cohabiting mothers. Therefore, the current study tested whether the link between mothers' type of work schedule and children's school readiness was conditional upon family structure.

### **The Mediating Roles of Mothers' Depressive Symptoms and Parenting Practices**

The third major contribution of this study was to examine potential mechanisms that underlie the relation between specific types of nonstandard work schedules and children's school readiness. More specifically, the current study tested mothers' depressive symptoms along with two indicators of positive parenting practices (i.e., cognitive stimulation and emotional supportiveness) as mediators of the link between nonstandard work and children's school readiness. Support for their inclusion as mediators is drawn from theory and research on the risks that nonstandard work schedules place on mothers' psychological distress, which may in turn jeopardize positive parenting practices relevant to the fostering of children's adjustment (Costa, 1996, 2003; Knuttson, 2003).

### **Mothers' Depressive Symptoms**

Mothers' experience of depression, which is among the most common forms of psychological distress reported by women, represents a major mental health and

parenting concern (Hoffman, Crnic, & Baker, 2006). Symptoms associated with depressed mood include loss of interest or pleasure in activities, fatigue or loss of energy, and feelings of worthlessness and guilt (American Psychiatric Association, 2000). Estimates of the prevalence of depressive symptoms among women range from modest to moderate (10-42%), particularly among mothers with young children (Bagner, Pettit, Lewinsohn, & Seely, 2010; Chaudron, Szilagyi, Kitzman, Wadkins, & Conwell, 2004; Horowitz, Briggs-Gowan, Storfer-Isser, & Carter, 2007). The prevalence of subthreshold levels of depressive symptoms are even more common with epidemiologic estimates as high as 57% of women (Wachs, Black, & Engle, 2009). Given the tendency for women to be primary caregivers, many young children may be exposed to mothers' depressive symptoms (Nylen, Moran, Franklin, & O'Hara, 2006).

**Mothers' nonstandard work schedules and depressive symptoms.** The fairly high rates of both employment at nonstandard times and depressive symptoms among mothers of young children is particularly concerning given the existing research that has found a positive association between working a nonstandard schedule and workers' psychological distress (Bohle & Tilley, 1998; Costa, 1996, 2003; Martens, Nijhuis, Van Boxtel, & Knottnerus, 1999; Jamal, 2004; Perry-Jenkins, Goldberg, Pierce, & Sayer, 2007). For example, a recent study by Perry-Jenkins and colleagues (2007) found elevated levels of depressive symptoms among nonstandard shift workers as opposed to standard-day shift workers. Furthermore, there is some evidence to suggest that mothers employed in irregular, rotating schedules are especially vulnerable to high levels of depressive symptoms. For example, two studies of nurses employed at nonstandard times

found that those working a rotating schedule had the highest level of depressive symptoms, followed by non-day and standard-day workers, respectively (Jamal & Jamal, 1982; Tasto, Colligan, Skjei, & Polly, 1978). This research adds to the growing literature base that indicates rotating schedules may be especially disruptive and difficult to manage by mothers and their children.

**Mothers' depressive symptoms and children's school readiness.** Turning to the link between mothers' depressive symptoms and young children's school readiness, an extensive body of research has documented the wide range of negative outcomes among children who are exposed to mothers' depressive symptoms (e.g., Cummings & Davies, 1999; Downey & Coyne, 1990; Goodman, Rouse, Connell, Robbins Broth, Hall, & Heyward, 2011; Goodman & Tully, 2006; Wachs et al., 2009). With regard to children's cognitive and academic well-being, extant research suggests that children of depressed mothers are at heightened risk for more negative outcomes as compared to children of nondepressed mothers (Goodman, 2007). In fact, preschool-aged children of depressed mothers tend to score lower on measures of their cognitive functioning, including the McCarthy Scales of Children's Abilities (Cogill, Caplan, Alexandra, Robsen, & Kumar, 1986; Hay & Kumar, 1995; Sohr-Preston & Scaramella, 2006). Additional research has linked mothers' depressive symptoms to children's lower academic performance, defined as a composite score of their grades, suspensions, and teacher-reports of performance (Anderson & Hammen, 1993).

Along with children's early academic skills, studies have also found linkages between mothers' depressive symptoms and children's behavior problems. To date, a

number of studies have reported elevated levels of externalizing problem behaviors among the children of depressed mothers (Brennan, Hammen, Andersen, Bor, Najman, & Williams, 2000; Forbes, Shaw, Fox, Silk, & Kovacs, 2006; Goodman & Gotlib, 2002). Further, several studies have replicated this finding among preschoolers, suggesting that young children may be especially vulnerable to their mothers' psychological state (Bagner et al., 2010; Connell & Goodman, 2002; Koblinsky, Kuvalanka, & Randolph, 2006).

### **Summary of the mediating role of mothers' depressive symptoms.**

Recognizing the risks posed by mothers' psychological distress, a few studies have considered depressive symptoms as a means of understanding the link between nonstandard work hours and children's well-being (Daniel et al., 2009; Han, 2005; Rosenbaum & Morett, 2009; Strazdins et al., 2004, 2006). Despite this, rarely have existing studies considered the potential implications specifically for *preschoolers*. Moreover, no study to date has considered mothers' depressive symptoms as a mediator of the link between specific types of work schedules and young children's school readiness. As such, this dissertation is poised to make a significant contribution to the existing literature by examining the mediating role of mothers' depressive symptoms in the association between types of mothers' work schedules (i.e., fixed, non-day and non-fixed, irregular) and preschoolers' early reading and mathematics skills and externalizing behavior problems.



### **Mothers' Positive Parenting Practices**

In addition to mothers' depressive symptoms, the quality of their parenting practices may also help explain the relation between nonstandard work schedules and children's well-being. Psychologists have long been interested in parenting behaviors, and the early work by Ainsworth (1969, 1973) and Bowlby (1969, 1973) highlighted the importance of the social interactions between mothers and their children. Generally, scholars have found that parenting attributes such as warmth, sensitivity, and responsiveness benefit children's well-being, whereas more negative parenting practices that involve harsh and punitive behaviors place children at risk for adverse developmental outcomes (Belsky, 2006; Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997; NICHD Early Child Care Research Network, 2005; Tamis-LeMonda, Bornstein, & Baumwell, 2001; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). Despite the importance of positive parenting practices for children's well-being, no study in the nonstandard work and children's outcomes literature has yet investigated the role of such practices. Therefore, this study sought to further understanding by testing the role of two positive parenting practices (i.e., cognitive stimulation and emotional supportiveness) as mediators of the pathways between mothers' work arrangements and children's school readiness.

**Mothers' cognitive stimulation.** Mothers' cognitive stimulation refers to their efforts to foster their children's perceptual, cognitive, and language development (Lugo-Gil & Tamis-LeMonda, 2008; Najarian, Snow, Lennon, Kinsey, & Mulligan, 2010). A key feature of cognitive stimulation involves mothers' awareness of children's

developmental level, and their subsequent efforts to guide children's development. The importance of such parenting practices is consistent with Vygotsky's (1978) theory that children's development is shaped by interactions with supportive adult caregivers. By recognizing their children's current level of development, parents who engage in these scaffolding behaviors are able to provide enough support to help their children reach higher levels of development (e.g., once children learn letters and letter sounds, parents may help them sound out words). Such support may involve mothers' flexibility and their use of complex and varied language (Berlin, Brady-Smith, & Brooks-Gunn, 2002).

**Mothers' emotional supportiveness.** Another important characteristic of mothers' positive parenting practices, emotional supportiveness, involves positive regard for their children and the display of sensitivity toward their children. Mothers' positive regard refers to their expression of love, affection, and respect for their children through verbal praising, encouragement or support during difficult tasks, and attentiveness to their children (Berlin et al., 2002). Mothers' sensitivity involves the extent to which mothers observe and respond to various behavioral and emotional cues (e.g., children's gestures and expressions), including instances of distress and nondistress. Sensitive parenting practices during the preschool period include being flexible and supportive by encouraging children to strive for autonomy, control, and independence, within the context of rules and limits (Berlin et al., 2002).

**Mothers' nonstandard work schedules and positive parenting practices.** The direct link between nonstandard work schedules and parenting practices is supported by evidence from previous studies indicating that mothers' employment in a nonstandard

schedule may make it difficult for them to engage in positive parenting practices (Grzywacz, Daniel, Tucker, Walls, & Leerkes, 2011; Heymann & Earle, 2001; Strazdins et al., 2006; but see Barnett & Gareis, 2007). Research has found that mothers who were employed in a nonstandard schedule during the first year of their children's lives demonstrated poorer maternal sensitivity and a lower quality home environment when children were three years-old (Grzywacz et al., 2011). Other results from a large Canadian cohort of children aged 2-11 years showed that mothers employed at nonstandard times were more likely to use hostile and ineffective parenting practices than were mothers employed at standard times (Strazdins et al., 2006).

The research considering whether different types of nonstandard schedules may be related to parenting practices is fairly limited and inconsistent. Heymann and Earle (2001) reported that the quality of the home environment was lower among mothers working an evening shift. In contrast, an exploratory study among nurses working evening shifts found no differences in child- or parent-reports of parenting practices (Barnett & Gareis, 2007). One possible explanation for this discrepancy may reflect the measures used to capture parenting. Heymann and Earle (2001) used total scores from the Home Observation Measurement of the Environment (HOME), a well-validated and reliable measure of the quality of a child's home environment. The other study relied on parents' and children's ratings of parenting skills such as "making me feel important and loved" (Barnett & Gareis, 2007).

**Mothers' positive parenting practices and children's school readiness.** A substantial body of research has consistently found that positive parenting practices are

related to young children's cognitive and behavioral well-being (e.g., Baumrind, 1967; Bornstein & Tamis-LeMonda, 1989; Bradley, Caldwell, & Rock, 1988; Grusec & Goodnow, 1994; Landry, Smith, & Swank, 2003; Maccoby & Martin, 1983). Moreover, parenting practices are particularly important during early childhood as it represents an important developmental period, during which salient cognitive and behavioral skills emerge (Bruner, 1975; Rovee-Collier, 1995). In particular, mothers' use of cognitively stimulating behaviors has been linked to preschoolers' optimal cognitive outcomes (Fagot & Gauvain, 1997; Hubbs-Tait, Culp, Huey, Culp, Starost, & Hare, 2002; Lugo-Gil & Tamis-LeMonda, 2008) and, to a lesser extent, to children's positive socioemotional adjustment (Zaslow et al., 2006). Similarly, emotionally supportive and sensitive parenting practices during the preschool period have been found to promote children's externalizing behavior problems (Eisenberg, Zhou, Spinrad, Valiente, Fabes, & Liew, 2005; Raver, 1996).

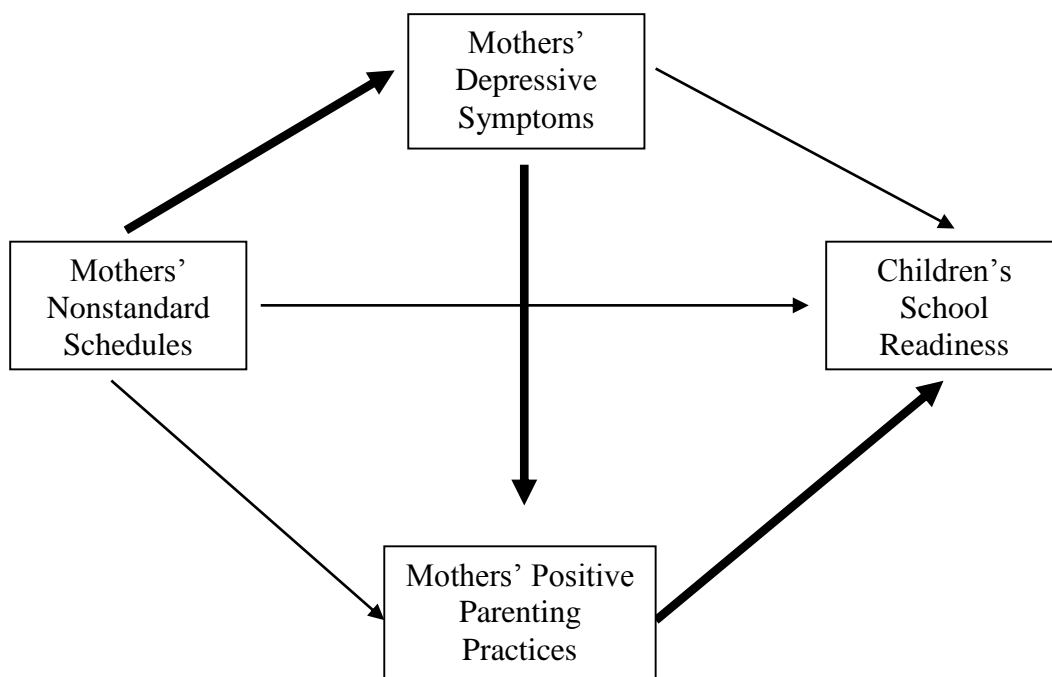
**Summary of the mediating role of mothers' parenting practices.** Given that working a nonstandard schedule may compromise mothers' ability to engage in positive parenting practices, it is striking, that to my knowledge, no study of the relation between mothers' nonstandard work and preschoolers' well-being has yet examined positive parenting practices as a mediator. One study did find that mothers' depressive symptoms and hostile/ineffective parenting practices partially mediated the link between nonstandard work schedules and preschoolers' externalizing problems (Strazdins et al., 2006). To address this gap in the literature, the current study sought to investigate two indicators of positive parenting practices (i.e., mothers' cognitive stimulation and

emotional supportiveness) as mediators of the relation between mothers' work schedules and children's school readiness.

### Multiple Mediators

Moreover, this dissertation investigated a model involving mothers' depressive symptoms and positive parenting practices as successive mediators of the association between work arrangements and preschoolers' development (see Figure 1). That is, mothers' nonstandard work hours were expected to pose a risk to mothers' experience of depressive symptoms. In turn, mothers' increased experience of depressive symptoms were expected to jeopardize their ability to engage in positive parenting practices (Cummings, Davies, & Campbell, 2000; Downey & Coyne, 1990; Haas, Li-Grining, & Bohnert, 2012; Lang, Field, Pickens, Martinez, Bendell, Yando, & Routh, 1996) which may lead to preschoolers' lower early academic skills and increased behavior problems.

Figure 1. Hypothesized Mediation Model (Bolding Indicates Pathway of Interest)



It is here that the work spillover model intersects with Conger and Elder's (1994) family stress model, which proposes that objective circumstances of economic hardship (e.g., low income, job loss) negatively impact parents' subjective well-being (e.g., depressed mood), which in turn disrupts parenting practices (Conger & Dogan, 2008; Conger et al., 2000; 2002; McLoyd, Jayaratne, Ceballo, & Borquez, 1994; McLoyd, Toyokawa, & Kaplan, 2008). Although mothers' nonstandard work is qualitatively different than job loss, as an objective condition of occupational stress, it may prove problematic for children via similar implications for parents' psychological well-being and parenting quality (McLoyd et al., 2008).

Empirical support for this link is found among a number of observational studies, which suggested that when compared with their nondepressed counterparts, depressed mothers showed higher rates of hostility and negative interactions (Goodman & Brumley, 1990; Gordon, Burge, Hammen, Adrian, Jaenicke, & Hiroto, 1989; Lovejoy, 1991). Additional research has shown that depressed mothers tend to be less responsive to their children, to be less sensitive in their interactions with their children, and to communicate less effectively (Cohn, Campbell, Matias, & Hopkins, 1990; Field, Healy, Goldstein, Guthertz, 1990; Goodman & Brumley 1990; Huang, Lewin, Mitchell, & Zhang, 2012; National Research Council & Institute of Medicine, 2009). Models involving two sets of mediators that are hypothesized to work in succession have been tested as part of studies in other areas of research (Bohnert, Martin, & Garber, 2007; Haas et al., 2012). However, to date, no previous studies on mothers' nonstandard work and children's well-being have examined such mediation models.

### **Child and Family Background Characteristics**

Existing studies have identified a set of characteristics that are likely to be related to both mothers' employment as well as young children's school readiness (e.g., Hill et al., 2005; Ruhm, 2004, 2009). Failing to control for these characteristics could result in biased estimates of the association between mothers' type of work schedule and preschoolers' well-being (Duncan, Brooks-Gunn, & Klebanov, 1994). Therefore, as a robustness check, this study will conduct additional analyses that control for the following child and family background characteristics: children's gender; mothers' race/ethnicity, education, income, and job prestige; and the type of child care used.

#### **Children's Gender**

Children's gender has been studied extensively in the maternal employment literature, though the results have been mixed. Several studies of preschool-aged children have reported few, if any, differences across gender (Hill et al., 2005), with some evidence suggesting gender differences are more salient for school-age children and adolescents (Waldfogel, 2006). When gender differences have been found, however, stronger deleterious effects tend to be found among boys rather than girls.

Similarly, findings relating to gender differences in young children's early academic skills are also mixed, where some studies find little evidence of a difference by gender (e.g., Duncan et al., 2007). Among those studies that have found differences, on average, girls have been found to perform less well than boys in mathematics (Chatterji, 2005, 2006; McCoach, O'Connell, Reis, & Levitt, 2006; Penner & Paret, 2008; Rathbun, West, & Germino-Hausken, 2004; Ready, LoGerfo, Burkam, & Lee, 2005). Among

boys, on average, scores on tests of reading skills tend to be lower than those seen among girls (Chatterji, 2006; McCoach et al., 2006; Ready et al., 2005).

Finally, in terms of children's externalizing problems, the findings from the extant research tend to be more straightforward. Generally, boys have been identified as a subgroup of children at risk for greater externalizing symptoms given their tendency to engage in more aggressive behaviors than is typically seen among girls (Dodge, Coie, & Lynam, 2006; Rubin, Burgess, Dwyer, & Hastings, 2003). This has been corroborated by parent reports (Bongers, Koot, Van der Ende, & Verhulst, 2003; Spieker, Larson, Lewis, Keller, & Gilchrist, 1999) as well as teacher-reports (Deater-Deckard, Dodge, Bates, & Pettit, 1998; Juliano, Werner, & Cassidy, 2006; Keiley, Bates, Dodge, & Pettit, 2000).

### **Mothers' Race/Ethnicity**

Using data from the Current Population Survey, sponsored by the U.S. Bureau of Labor Statistics and the Census Bureau, Presser (2003) found that non-Hispanic African American women were significantly more likely to work a nonstandard work shift than were Hispanic or European American women. In addition, race/ethnic gaps in children's school readiness have been detected. In particular, ethnic minority children tend to score lower in academic achievement and higher in behavior problems (Dodge, Pettit, & Bates, 1994; Hedges & Nowell, 1995; Jencks & Phillips, 1998; Keiley et al., 2000).

### **Mothers' Education**

Regarding mothers' level of education, Presser (2003) reports a negative association between educational attainment and working a nonstandard schedule. Nonstandard schedules are most prevalent among individuals with lower levels of



education, and particularly among individuals without a high school education (26.2%).

Further, with regard to children's well-being, years of mothers' education has consistently been found to be positively associated with children's well-being, especially their cognitive skills and academic achievement (Davis-Kean, 2005; Haveman & Wolfe, 1995; Magnuson, 2007; Sirin, 2005).

### **Mothers' Income**

Just as nonstandard work is more common among individuals with a lower educational attainment, it is also more common among those with lower incomes, and particularly among those working in low-wage occupations (Presser, 2003). This is concerning given that one of the most extensively replicated findings in the developmental literature is the positive relation between income and children's well-being (Morris & Gennetian, 2004; Yeung, Linver, & Brooks-Gunn, 2002).

### **Mothers' Job Prestige**

In terms of mothers' job prestige, theory and existing research suggest that high prestige, professional occupations are far more likely to involve substantive and satisfying work experiences that also afford mothers flexibility to address needs of their families and children (Brooks-Gunn et al., 2010; Parcel & Menaghan, 1990). In contrast, low prestige positions are frequently characterized by routinized work that involves low autonomy and flexibility, which has been found to exacerbate the experience of psychological distress (De Jonge, Dormann, Janssen, Dollard, Landeweerd, & Nijhuis, 2001; Kohn & Schooler, 1982, 1983). These lower prestige occupations are

disproportionately common among mothers employed in nonstandard work schedules (Presser, 1995, 2003).

While the broader employment literature has found job prestige and occupational complexity to be linked with individuals' well-being, less is known about its relation to children's well-being (Conley & Yeung, 2005). One of the few existing studies compared mothers employed in professional and nonprofessional positions and found no differences across a wide range of young children's cognitive and socioemotional skills, including scores on the Woodcock Johnson Achievement and Cognitive Batteries (WJR) and the Social Skills Rating System (SSRS). In contrast, Parcel & Menaghan (1994) found that mothers' occupational complexity, a closely related construct that reflects the level of opportunities for self-direction and autonomy within a given occupation, was related to three to six year-old children's receptive vocabulary and behavior problems.

### **Type of Child Care**

The association between mothers' type of work schedules and young children's school readiness may also be related to the type of child care used by families. Indeed, the type of child care used by mothers working standard-day shifts tends to be different than the care used by mothers employed at nonstandard times. Specifically, prior research reveals that children of mothers in a nonstandard work arrangement are more likely to receive care from their fathers (among married-parents families) and relatives/nonrelatives (among single-parent families) (Han, 2004; Presser, 2003). In contrast, mothers working in standard-daytime schedules more frequently rely on family day care or center-based care (Han, 2004). This is especially relevant to children's well-

being as the child care literature has shown higher cognitive performance among those children in center-based care, as compared to children in other types of arrangements (NICHD Early Child Care Research Network, 2002).

### **Research Questions and Hypotheses**

To review, the current study was the first to investigate whether the link between specific types of nonstandard work and preschoolers' well-being was explained by a series of moderation and mediation models that are grounded in the existing literature. First, this study investigated the overall link between specific types of mothers' work schedules and preschoolers' early academic skills and externalizing problems. Second, the moderating roles of mothers' job and family characteristics were tested. Finally, the mediating roles of mothers' depressive symptoms and parenting practices were also examined. In particular, this dissertation was guided by the following research questions and corresponding hypotheses, each of which were tested all four school readiness indicators: early reading skills, early mathematics skills, and externalizing behavior problems (both maternal-report and early care and education provider-report).

#### **Overall Link Between Nonstandard Work and Children's School Readiness**

- 1) Are mothers' work schedules associated with young children's school readiness?

##### *Hypothesis 1*

It was hypothesized that mothers' nonstandard work schedules would be negatively linked to young children's school readiness. In particular, the worst outcomes are expected for children whose mothers worked a non-fixed, irregular schedule,

followed by children whose mothers worked a non-day schedule, and then followed by children whose mothers worked a standard-day schedule, respectively.

### **The Moderating Roles of Mothers' Job and Family Characteristics**

- 2) Do mothers' work hours moderate the link between mothers' work schedules and children's school readiness?

#### *Hypothesis 2*

It was hypothesized that the association between mothers' work schedules and young children's school readiness would not be universal and would instead differ by the number of hours mothers worked. In particular, it was expected that the combination of a nonstandard work schedule and more work hours would be particularly detrimental for children's school readiness.

- 3) Does family structure moderate the link between mothers' work schedules and children's school readiness?

#### *Hypothesis 3*

It was expected that the relation between work schedules and school readiness would differ by family structure such that the negative influence of nonstandard work would be more pronounced among children with the fewer resources associated with having a mother who is single or cohabiting.

### **The Mediating Roles of Mothers' Depressive Symptoms and Positive Parenting Practices**

- 4) Do mothers' depressive symptoms mediate the link between mothers' work schedules and children's school readiness?

*Hypothesis 4*

It was hypothesized that mothers' nonstandard work schedules would be positively associated with depressive symptoms, which in turn would be negatively associated with young children's school readiness.

- 5) Does mothers' cognitive stimulation mediate the link between mothers' work schedules and children's school readiness?

*Hypothesis 5*

It was hypothesized that mothers' nonstandard work schedules would be negatively related to mothers' cognitive stimulation, which in turn would be positively associated with young children's school readiness.

- 6) Does mothers' emotional supportiveness mediate the association between mothers' work schedules and children's school readiness?

*Hypothesis 6*

This study hypothesized that mothers' nonstandard work arrangements would be negatively related to their emotional supportiveness, which in turn would be positively linked to children's school readiness.

- 7) Were mothers' depressive symptoms and positive parenting practices successive mediators of the negative link between mothers' work schedules and young children's school readiness?

*Hypothesis 7a*

The current study hypothesized that mothers' nonstandard work schedules would be positively linked to depressive symptoms, which in turn would be negatively related

to their cognitive stimulation. Finally, mothers' cognitive stimulation would be positively linked to children's school readiness.

*Hypothesis 7b*

It was expected that mothers' nonstandard work schedules would be positively linked to depressive symptoms, which in turn would be negatively related to their emotional supportiveness. Lastly, mothers' emotional supportiveness would be positively linked to children's school readiness.

## CHAPTER TWO

### METHOD

#### **Participants**

The data for this study were drawn from the preschool wave ( $N \sim 8,700$ ) of the Early Childhood Longitudinal Study – Birth Cohort (ECLS-B), a nationally representative sample of children born in the United States in 2001. The ECLS-B was designed by the National Center for Education Statistics (NCES) to provide detailed, longitudinal information about young children’s development, care, and education. The final sample for the ECLS-B was selected using a clustered, list frame sampling design in which the list frame was registered births in the National Center for Health Statistics’ (NCHS) vital statistics system. Births were then randomly sampled from 96 core primary sampling units (PSUs), which were defined as counties and county groups. Children who had been adopted after their birth certificate was issued were excluded from the study. Additionally, state confidentiality concerns led to the exclusion of children born to mothers under the age of 15. To ensure that the sample would be nationally representative, the children were drawn from diverse socioeconomic and racial/ethnic backgrounds, and several groups were oversampled to ensure usable data (i.e., Asian and Pacific Islander children, American Indian and Alaska Native children, twins, and low and very low birth weight children). The preschool wave of data collection included

children who were approximately 4-years-old ( $M = 52.46$  months), the majority of whom were expected to start kindergarten the following year (Najarian et al., 2010).

### **Procedure**

Measures included interviews with parents ( $N \sim 8,700$ ), interviews with early care and education providers (ECEPs;  $N \sim 6,000$ ), and direct assessments of the children ( $N \sim 8,300$ ). Computer-assisted personal interviewing technology was used for in-person, home interviews with children's primary caregivers, which was the mother in 95% of cases. These parent interviews included questions on child and family background characteristics, as well as mothers' employment experiences and psychological well-being.

Direct assessments of children's cognitive abilities (i.e., early reading and mathematics skills) were conducted in the home by assessors who received comprehensive training by NCES in the standardized administration of each particular assessment. These cognitive assessments were administered in about 30-45 minutes (U.S. Department of Education, 2010). Children and their mothers participated in a semi-structured play activity called the Two Bags Task, which lasted 10 minutes, and was video recorded for later coding and scoring of parenting behaviors. Finally, assessors asked parents for the name, address, and phone number of any ECEPs with whom children spent time during the week. They then conducted telephone interviews with children's primary ECEP which included questions regarding children's socioemotional adjustment.



## Measures

### Preschoolers' Early Academic Skills

One of the greatest strengths of the ECLS-B is the extensive amount of data obtained directly from the children themselves. Capitalizing on this, the current study captured preschoolers' early reading and mathematics skills using direct child cognitive assessments. This measure was designed to provide broad measures of reading and mathematics abilities that were developmentally appropriate for children approximately 4-years-old (U.S. Department of Education, 2010). As no single, existing instrument could achieve those goals, a direct child cognitive assessment was developed specifically for the ECLS-B.

The creation of this measure involved a field test instrument comprised of 120 reading items and 71 mathematics items that was administered to preschool-aged children. The items for the field test assessment were drawn from a number of psychometrically sound instruments, including the Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPPP; Lonigan, Wagner, Torgesen, & Rashotte, 2002), and the Test of Early Mathematics Ability-2 (TEMA-2; Ginsburg & Baroody, 1990). For a comprehensive list of the instruments used to create the field test item pools, please see Table 1.

**Early reading skills.** Following psychometric analyses of the 120 reading items in the field test instrument, a final reading assessment of 35 items that covered a number of key domains in emergent and early reading (e.g., phonological awareness, letter sound recognition, awareness of the conventions of print, and word recognition) was created.

Table 1. Sources and Number of Items in the ECLS-B Reading and Mathematics Assessments Field Test

Source	Literacy items	Mathematics items
PreLAS 2000	22	0
Peabody Picture Vocabulary Test–Third Edition (PPVT-III)	32	0
Preschool Comprehensive Test of Phonological and Print Processing (Pre-CTOPP)	35	0
Elision subtest	8	0
Initial Sound Matching Subtest	4	0
Test of Early Mathematical Ability-3 (TEMA-3)	0	2
Family and Child Experiences Survey (FACES)	7	1
Early Childhood Longitudinal Study - Kindergarten	11	29
Original items	1	39
Total	120	71

Please see Table 2 for a list of constructs and the number of items included in the ECLS-B preschool reading measure. First, the items capturing children’s phonological awareness were drawn from a subset of the Pre-CTOPPP (Lonigan et al., 2002) and included both multiple choice and free response items that asked children to manipulate words and sounds. For example, a trained assessor would show a child four pictures and say, “Look at these pictures: baseball, hotdog, cupcake and highchair. Now listen carefully to what I say and point to the word you hear. Hot—dog (with a one second pause between the two words). What word does this make?”

The three remaining domains were captured with the following items. Children’s letter knowledge was assessed by items from subsets of the Preschool Language Assessment Scale 2000 (PreLAS 2000; De Avila & Duncan, 2000). Also, children’s awareness of the conventions of print was measured by a subset of items from the Pre-CTOPPP (Lonigan et al., 2002), which assessed whether children recognized individual letters and letter-sound correspondences, as well as their ability to differentiate words in

Table 2. ECLS-B Direct Cognitive Assessment Constructs and Number of Items

Construct	Number of items	Number of practice items
Early Reading Assessment		
Phonological awareness	8	4
Letter sound knowledge and letter recognition	13	2
Print conventions	9	0
Word recognition	5	1
Total	35	7
Early Mathematics Assessment		
Number sense	10	3
Counting	14	3
Operations	8	3
Geometry	10	4
Pattern understanding	4	2
Total	35	7

print from pictures and symbols. Finally, children's word recognition was captured by another subset of items from the PreLAS 2000 (De Avila & Duncan, 2000), which asked children to verbally identify various simple words (e.g., cat). From these 35 items, a reading theta score ( $M = -0.49$ ,  $SD = 0.74$ ) was calculated ( $\alpha = .84$ ) as it provides an estimate of children's ability in a particular domain. Validity of the reading assessment was assessed by concurrent administration of the School Readiness subtests of the Bracken Basic Concept Scale-Revised (BBCS-R; Bracken, 1998) with the reading field test items. The BBCS-R is a receptive measure of children's basic concept development (e.g., letters, numbers/counting, sizes, and comparisons). The correlation between the BBCS-R 'Letters' subtest with the ECLS-B reading field test items was .82, providing evidence of adequate concurrent validity with an accepted measure of young children's emergent reading skills (Najarian et al., 2010).

**Early mathematics skills.** Similar to the reading assessment, psychometric analyses were used to cull the 71 mathematics items used in the field test instrument

down to a more manageable total. The final mathematics assessment included a total of 46 items which examined children's understanding of numbers, counting, operations, geometry, and patterns. Please refer to Table 2 for a specific list of constructs and the number of items included in the ECLS-B preschool mathematics assessment.

Regarding administration, the mathematics assessment was a two-stage assessment, where all children were first given a core or common set of items. The core set of items evaluated children's knowledge of relative size, quantity, and ordinality, as well as the ability to match patterns, to continue patterns, to count, and to recognize numbers. The second stage of the mathematics assessment involved supplemental items being administered to those children who performed very poorly or very well on the core items. Those children who performed very poorly received additional, basal items of a much lower level of difficulty that assessed their knowledge of shapes and their ability to count fingers and objects in pictures. Those children who performed very well on the core set of items then received additional items of a higher level of difficulty, which included word problems. From the 46 items, a theta score was calculated ( $M = -0.47$ ,  $SD = 0.78$ ) was calculated ( $\alpha = .89$ ). Similar to the reading assessment, validity of the mathematics assessment was assessed by concurrent administration of the BBCS-R (Bracken, 1998) with the mathematics field test items. The correlation between the BBCS-R 'Numbers' subtest with the ECLS-B mathematics field test items was .75, which suggests adequate concurrent validity with an accepted measure of young children's emergent mathematics skills (Najarian et al., 2010).

### **Preschoolers' Externalizing Behavior Problems**

The ECLS-B collected information about preschoolers' socioemotional adjustment from children's mothers and early care and education providers (ECEPs) via interviews with trained assessors. Specifically, items were drawn from the Preschool and Kindergarten Behavior Scales – Second Edition (PKBS-2; Merrell, 2002), which is a 42-item measure of children's socioemotional adjustment. Multiple studies have recognized the PKBS-2 as a reliable and valid measure of socioemotional adjustment among young children (e.g., Laffey-Ardley & Thorpe, 2006; Merrell, 2002; Riccio, 1995). Validity studies of the PKBS-2 have been extensive (e.g., Merrell, 1995a, 1995b; Merrell & Holland, 1997; Merrell & Wolfe, 1998; Jentzsch & Merrell, 1996), including reports of moderate to strong correlations between the PKBS-2 and a number of other measures of children's problem behaviors including the Social Skills Rating System (SSRS; Gresham & Elliott, 1990) and the Conners Teacher Rating Scales (CTRS-39; Conners, 1990). An abbreviated, 24-item version of the PKBS-2 was chosen for use in the ECLS-B.

Given that measures of children's adjustment often vary by reporter and context (e.g., home and child care), this study will include maternal-report and ECEP-report of children's externalizing behavior problems. Certainly, mothers' reports of their children's well-being provide valuable and useful information; however, their reports may be confounded with mothers' own well-being. In particular, the "depression-distortion hypothesis" suggests that mothers with high levels of depressive symptoms tend to rate their children's socioemotional adjustment more harshly than do other mothers (Loeb, Fuller, Kagan, & Carrol, 2004; NICHD Early Child Care Research

Network, 1999a; Yeung, Linver & Brooks-Gunn, 2002; but see Richters & Pellegrini, 1989; Richters, 1992). To address such issues of shared method variance across maternal report measures, both maternal-report and ECEP-report of children's externalizing problems were examined.

Mothers and ECEPs were asked to consider children's behavior across the previous three months, and to report whether each item had been observed, on a scale of 1 to 5. These responses were coded such that higher scores reflected greater levels of adjustment problems (i.e., 1 = never, 2 = rarely, 3 = sometimes, 4 = often, and 5 = very often). For both reporters, there were 8 items, which asked, for example, how often children were physically aggressive, impulsive, overly active, and prone to tantrums (parent-report  $\alpha = .80$ ; ECEP-report  $\alpha = .90$ ). A composite score was created for both measures of problem behaviors, such that each set of 8 items was summed to create a total score for mothers and ECEPs with valid data across all items.

### **Mothers' Work Schedules**

In order to measure mothers' work schedules, information was drawn from the parent interview, which included a question asking mothers, "Which of the following best describes the hours you usually work at your main job?" Mothers were then asked to select between a daytime, evening, night, rotating, split, or other schedule. From this question, I created dummy variables classifying mothers into three groups: 1) a standard-day group (reference group) which includes mothers who reported a standard schedule, 2) a fixed, non-day group (i.e., those reporting evening or night shifts), and 3) a non-fixed, irregular group (i.e., those reporting rotating, split, or other schedules).

With respondents being asked which type of schedule best describes their work hours at their main job, this measure likely provides fairly conservative estimates of the prevalence of nonstandard work. For example, these estimates do not include those individuals who work a majority of their hours during the day, but whose work also carries over into evening or night hours. Likewise, this also means that among those employees who work multiple jobs, their nonstandard work hours would not be counted if their “main” job was scheduled during daytime hours. Although the prevalence of nonstandard hours would be higher if such situations were taken into account, defining work schedules in this way allows for a sharper distinction between types of work schedules (Presser, 2003).

### **Mothers’ Job and Family Characteristics**

Moderators included mothers’ job and family characteristics. Mothers work hours were captured by a continuous variable indicating the number of hours per week that mothers usually worked for pay. For family structure, families with married parents were coded as a 2, and parents who were not married were coded as a 1. Parents who are not married include both cohabiting and single mothers, who tend experience similar financial and social resources (Brown, 2004, 2006).

### **Mothers’ Depressive Symptoms**

The ECLS-B included a modified version of the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977, 1991). The CES-D has been used to identify depressive symptoms among both clinical and general populations sample and is a reliable and valid measure of depression (Radloff, 1977, 1991; Radloff & Locke, 1986;

Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977). The validation of this scale across multiple populations has been extensive, with a number of studies providing evidence of its correlation with other self-report measures of depressive symptoms and clinical ratings of depression (Poulin, Hand, & Boudreau, 2005; Radloff, 1977).

Furthermore, the short form version has been used in a number of large-scale, nationally representative studies, including the Early Childhood Longitudinal Study – Kindergarten cohort (see Ross, Mirowsky, & Huber, 1983 for a more detailed discussion of the psychometrics of the short form). A total of 12 items asking how often individuals have experienced certain feelings or experiences during the previous week were summed to create an overall score of depressive symptoms ( $\alpha = .87$ ). Example items from the CES-D include “felt that I could not shake off the blues even with help from my family and friends” and “felt depressed.” Items were scored on a 1 to 4 scale (1 = rarely or never, 2 = some or a little, 3 = occasionally or moderately, 4 = most or all). Per the recommendation of the NCES, the 12 items were summed to create a total score of mothers’ depressive symptoms for those mothers who had valid data on all 12 items.

### **Mothers’ Positive Parenting Practices**

The measure of mothers’ positive parenting practices (i.e., cognitive stimulation and emotional supportiveness) were drawn from the Two Bags Task, a semi-structured and standardized play activity between mothers and children. This task is a simplified version of the Three Bags Task, which has been successfully used in other large-scale studies such as the Administration for Children and Families’ Early Head Start (EHS) Research and Evaluation Project and the NICHD SECCYD (Najarian et al., 2010;



NICHD Early Child Care Researcher Network, 1998, 1999b). Concurrent and predictive validity with children's cognitive outcomes have been established (Tamis-Lamonda et al., 2004). The Two Bags protocol was administered by trained field interviewers in families' homes, and the interactions between the mother-child dyads were video recorded.

Specifically, the mother-child dyads were instructed that they had 10 minutes to play with the contents of two numbered bags and the only restriction was that they must use the bags in order (Najarian et al., 2010). The first bag contained a children's picture book, *Corduroy* (Freeman, 1968), and the second bag contained two containers of Play-Doh®, two cookie cutters, and a rolling pin. Their subsequent interaction was coded to provide ratings of mothers' parenting practices (e.g., mothers' cognitive stimulation and emotional supportiveness).

The video recorded play interactions were scored by trained coders using a 7-point Likert-type rating scale that ranged from very low (1) to very high (7) that was developed for the EHS Research and Evaluation Project (Brady-Smith, Fauth, & Brooks-Gunn, 2003). Coders watched the video recordings looking for target behaviors that reflected cognitive stimulation and emotional supportiveness. When the recording ended, coders assigned a single rating for each parenting scale based on their observations and notes taken during the video. For both mothers' cognitive stimulation and emotional supportiveness scores, variables were provided with the ECLS-B data.

**Mothers' cognitive stimulation.** To capture cognitive stimulation, coders rated mothers' efforts to foster their children's perceptual, cognitive, and language

development (Najarian et al., 2010). Mothers' behavior was scored as more stimulating if they demonstrated awareness of children's developmental level along with efforts to bring the child to the next level. If their efforts were seen as not matching or above the child's developmental level, then the mothers' behavior was not recognized as stimulating cognitive development (Snow et al., 2007). The average reliability (percent agreement) for coders' ratings of mothers' cognitive stimulation was 96.7% (range of percent agreement = 85–100%).

**Mothers' emotional supportiveness.** The emotional supportiveness rating was designed to capture mothers' sensitivity and positive regard for their children. Coders focused on mothers' emotional availability and physical and affective presence during the Two Bags Task. In particular, target behaviors included: (1) mothers providing their children with a secure base from which they could explore their surroundings, and (2) mothers displaying emotional support and enthusiasm for their children's work (Snow et al., 2007). The average reliability (percent agreement) for coders' ratings of mothers' emotional supportiveness was 97.1% (range of percent agreement = 85–100%).

### **Child and Family Background Characteristics**

Children's gender was represented in the models by a dummy variable such that girls were coded as '0' and boys were coded as '1'. In terms of mothers' race/ethnicity, dummy variables were created for each of the five categories: 1) White, non-Hispanic (reference group), 2) Hispanic (coded as '0' or '1'), 3) Black or African American, non-Hispanic (coded as '0' or '1'), 4) Asian or Pacific Islander (coded as '0' or '1'), and 5) other race/ethnicities (coded as '0' or '1'). Similarly, mothers' educational attainment

was included in the models via dummy variables for the five categories: 1) less than a high school diploma (reference group), 2) high school diploma or GED, 3) some college or a vocational degree, 4) bachelor's degree, and 5) graduate degree.

The ECLS-B provided mothers' income in increments of \$5,000 up to \$40,000 per year, and then listed income in increments of \$10,000. As such, dummy variables representing four categories of income were created: 1) low income (those families who were below the poverty line based on number of persons in the household), 2) lower middle (those families whose income was below the 2005 median U.S. income, 3) upper middle (those families whose income was above the 2005 median U.S. income, and 4) upper/high income (those families whose income was above the top 20% of 2005 U.S. income). Also, a dummy variable distinguishing between mothers' high and low job prestige was used by taking a median split of their job prestige scores. The ECLS-B based those prestige scores on definitions from the 1989 General Social Survey (Najarian et al., 2010). Finally, child care type was also represented by dummy variables distinguishing between: 1) center-based care, 2) relative care, and 3) non-relative care.

## CHAPTER THREE

### RESULTS

#### **Data Preparation**

As a first step, all the variables needed for the analyses were extracted from the ECLS-B electronic codebook (ECB) and carefully cleaned by checking for missing or unexpected values. As described more fully in the measures section, composites were created for children's behavior problems and mothers' depressive symptoms. Additionally, each of the categorical variables was dummy coded to allow for their inclusion in the regression models.

Next, the analytic dataset for the main set of cross-sectional analyses using mothers' work schedules during children's preschool year was created. Although the overall ECLS-B sample consists of approximately 10,700 cases, the  $n$  for the analyses discussed in the current study is substantially smaller ( $n = 3,480$ ). This reduction in sample size was mainly the result of participant attrition between the 2001-2002 base year and 2005-2006 preschool year data collection waves (~1700 cases), the exclusion of mothers who were unemployed during the preschool year (~3700 cases), and missing or uncodeable DVDs for the Two Bags task (~1100 cases). The remaining difference between the 10,700 cases and the analytic sample of 3,480 cases was due to incomplete data across variables. Additionally, early care and education providers' (ECEP)

reports of children's externalizing behavior problems were only collected among a subset of preschoolers (~6,000). As such, those models including ECEPs' reports of children's problem behaviors are based on a slightly smaller sample ( $n = 2,879$ ).

### **Attrition Analyses**

Regarding missing data, attrition analyses were conducted to investigate whether cases with no missing data (i.e., valid data on all variables) were systematically different from those cases with some amount of missing data (i.e., valid data on some but not all variables). This was accomplished by creating a dummy variable which distinguished cases with and without missing data, and then testing whether there were statistically significant differences between those two groups across a series of child and family demographic characteristics. The results from these chi-square tests indicated that there were no significant differences between the two groups across children's gender ( $\chi^2(1) = 1.95$ , *n.s.*), however, there were significant differences across mothers' race/ethnicity ( $\chi^2(4) = 96.73$ ,  $p < .001$ ), level of education ( $\chi^2(4) = 305.34$ ,  $p < .001$ ), and income bracket ( $\chi^2(3) = 187.06$ ,  $p < .001$ ). More specifically, these results suggest that mothers who were of ethnic minority status, had a lower level of educational attainment, and who were in a lower income bracket were more likely to have some amount of missing data.

Although it was originally proposed that missing data would be handled by the multiple imputation (MI) by chained equations technique in Stata (Royston, 2004), the substantial amount of missing data and the significant attrition analyses preclude the use of MI as an appropriate method. In particular, when there is a high proportion of missing data, the algorithms used to impute the data require substantially increased run lengths to

produce results (Bodner, 2008; Rubin, 1987; Sterne et al., 2009). As a more efficient alternative, listwise deletion was used to limit the analytic samples to only those cases with complete data.

### **Data Screening**

As a next step, the data were screened for normality and the presence of outliers. Per the recommendation of Tabachnick and Fidell (2007), more attention was given to the distributions themselves rather than the skewness and kurtosis statistics as those values are virtually always significant in large samples. Children's early reading and mathematics skills, along with mothers' positive parenting practices (i.e., cognitive stimulation and emotional supportiveness) appeared to have normal distributions. In contrast, both measures of children's externalizing behavior problems and mothers' depressive symptoms, however, were positively skewed. A square root transformation improved the distribution of mothers' reports of children's problem behaviors, while a log transformation was more successful with ECEPs' reports of behavior problems. As mothers' depressive symptoms were strongly skewed, a more severe transformation was needed. Specifically, a negative inverse transformation provided the most improvement in the distribution of mothers' depressive symptoms.

### **Weights**

After preparing the study variables, the next step in data preparation was to address the issue of weights. Given that the ECLS-B data was collected using a complex sample design, NCES recommends the use of survey weights with analysis (Najarian et al., 2010). Weights are inversely related to the likelihood of being selected into a sample

and account for oversampling of certain target populations (Has-Vaughn, 2005; U.S. Department of Education, 2010). Preparing the raw weights for the statistical analyses involved a two-step process detailed in the ECLS-B preschool wave user's manual (Najarian et al., 2010). First, the raw weights are normed for the analytic samples, then the renormed weights are divided by the appropriate DEFF adjustment value, which is provided in the user's manual. Collectively, these steps account for oversampling and the possibility of dependence among observations that may result from the complex sample design (Hahs-Vaughn, 2005).

### **Descriptive Statistics**

After preparing the data for analyses, descriptive statistics were run for all study variables for the main set of analyses using mothers' work schedules during the preschool year. Table 3 presents the means, standard deviations, and ranges for the continuous measures and percentages for the categorical measures. Intercorrelations between the continuous variables are displayed in Table 4. The results demonstrated that mothers were predominantly employed in standard work schedules (78.8%), while 11.8% of mothers worked non-day schedules, and 9.4% of mothers worked irregular schedules.

Regarding children's early academic skills, the means and standard deviations of both children's early reading skills ( $M = -0.42$ ,  $SD = 0.71$ ) and early mathematics skills ( $M = -0.38$ ,  $SD = 0.74$ ) were just slightly lower than the statistics provided by NCES for the overall ECLS-B sample (Najarian et al., 2010). Originally based on a scale with a possible range of 8-40, mothers' reports of children's externalizing behavior problems

Table 3. Descriptive Statistics

	<i>M</i>	<i>SD</i>	%	Range
Child Characteristics				
Male			50.7%	
Early Academic Skills				
Early Reading Skills	-0.42	0.71		-2.38 — 2.60
Early Mathematics Skills	-0.38	0.74		-2.80 — 2.38
Externalizing Behavior Problems				
Maternal Report	4.31	0.51		2.83 — 6.16
ECEP Report	1.21	0.16		0.90 — 1.60
Maternal Characteristics				
Work Schedules				
Standard			78.8%	
Non-Day			11.8%	
Irregular			9.4%	
Work Hours				
30 Or Fewer Hours Per Week			27.5%	
30+ Hours Per Week			72.5%	
Mothers' Race/Ethnicity				
White, Non-Hispanic			60.9%	
Hispanic			18.9%	
Black, Non-Hispanic			14.9%	
Asian or Pacific Islander			2.6%	
Other Race/Ethnicities			2.6%	
Educational Attainment				
Less Than a High School Diploma			7.7%	
High School Diploma or GED			26.1%	
Some College/Vocational Degree			35.5%	
Bachelor's Degree			17.3%	
Graduate Degree			13.3%	
Level of Income				
Low Income			22.3%	
Lower Middle Income			27.8%	
Upper Middle Income			32.2%	
Upper Income			17.7%	
High Job Prestige			51.5%	
Depressive Symptoms	-0.06	0.02		-0.08 — -0.03
Positive Parenting Practices				
Cognitive Stimulation	4.27	0.93		1 — 7
Emotional Supportiveness	4.46	0.90		1 — 7
Family Characteristics				
Family Structure				
Married			67.1%	
Single/Cohabiting			32.9%	
Type of Child Care				
Center-Based Care			65.3%	
Relative Care			20.8%	
Non-Relative Care			13.9%	



Table 4. Intercorrelations Between Children's School Readiness and Mothers' Depressive Symptoms and Positive Parenting Practices

Variables	1	2	3	4	5	6	7
1. Children's early reading skills	-						
2. Children's early mathematics skills	0.74 ***	-					
3. Children's externalizing problems <sup>1</sup>	-0.19 ***	-0.2 ***	-				
4. Children's externalizing problems <sup>2</sup>	-0.21 ***	-0.23 ***	0.34 ***	-			
5. Mothers' depressive symptoms	-0.08 *	-0.08 *	0.19 ***	0.09 ***	-		
6. Mothers' cognitive stimulation	0.20 ***	0.18 ***	-0.05	-0.05 **	-0.07 **	-	
7. Mothers' emotional supportiveness	0.19 ***	0.17 ***	-0.05	-0.06 **	-0.07 **	0.58 ***	-

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

<sup>1</sup> Maternal-report

<sup>2</sup> ECEP-report

had a mean of 4.31 ( $SD = 0.51$ ). Because these scores were transformed by taking the square root of each case, the transformed values are smaller than they were originally, but the direction of the scale is the same such that higher values indicate more externalizing problems. Similarly, ECEPs' reports of children's problem behaviors were originally measured on a scale with a possible range of 8-40. After performing a log transformation, the mean was 1.21 ( $SD = 0.16$ ) indicating the values were made smaller by the transformation, but the interpretation remains the same, such that a higher value indicates more externalizing behaviors.

In terms of mothers' depressive symptoms, mothers in the ECLS-B reported fairly low levels of depressive symptoms ( $M = -0.06$ ,  $SD = 0.02$ ). The original scale had a possible range of 12-48, but a negative inverse transformation was used to improve the distribution. Taking the inverse of a number makes large numbers small and vice versa, so taking the *negative* inverse results in values that are interpreted in the same direction, meaning a higher value indicates more depressive symptoms. This finding suggests mothers in the ECLS-B reported fairly low levels of depressive symptoms. For mothers' positive parenting practices, both cognitive stimulation and emotional supportiveness were measured on a scale of 1-7. The means and standard deviations for these indicators of positive parenting were fairly similar to each other ( $M_{Cognitive\ Stimulation} = 4.27$ ,  $SD_{Cognitive\ Stimulation} = 0.93$ ;  $M_{Emotional\ Supportiveness} = 4.46$ ,  $SD_{Emotional\ Supportiveness} = 0.90$ ).

Next, descriptive analyses of the child and family characteristics found that 50.7% of the sample was male. Additionally, a majority of mothers were non-Hispanic White (60.9%), while 18.9% were Hispanic, 14.9% were non-Hispanic Black or African

American, 2.6% were non-Hispanic Asian or Pacific Islander, and 2.6% were another race/ethnicity. In terms of mothers' level of educational attainment, only 7.7% of the sample had less than a high school diploma, while 26.1% had a high school diploma or GED, 35.5% reported having completed some college or a vocational degree, 17.3% had a bachelor's degree, and 13.3% had a graduate degree.

With regard to the four income brackets, 22.3% of mothers' income was within the low income bracket, 27.8% reported income within the lower middle bracket, 32.2% reported income within the upper middle bracket, and 17.7% reported income in the high income bracket. For mothers' job prestige, 51.5% of the sample had a high level of job prestige. Finally, in terms of type of child care, 65.3% of children were in center-based care, while 20.8% were in relative care, and 13.9% were in non-relative care.

Additionally, Table 5 presents descriptive information on each of the covariates broken down by type of work schedule. Although the work schedule groups were fairly evenly matched across gender, the percentages for the non-day and irregular schedules groups were less consistent across the remaining variables. For example, the pattern was different for mothers' income, such that among mothers employed in a standard work schedule, most reported income that placed them in the upper middle income bracket. In contrast, among mothers employed in a non-day schedule, the majority were in the lower middle income bracket. Finally, with respect to those mothers working an irregular shift, the most common income bracket was the upper middle bracket.

Table 5. Descriptive Statistics for Work Schedules by Demographic Characteristics

	Standard	Non-Day	Irregular
Children's Gender			
Female	39.6%	5.1%	4.6%
Male	39.3%	6.6%	4.6%
Mothers' Race/Ethnicity			
White	48.7%	6.2%	6.0%
Hispanic	15.0%	2.4%	1.6%
Black	11.0%	2.7%	1.0%
Asian	2.2%	0.2%	0.2%
Other	2.0%	0.2%	0.4%
Mothers' Education			
Less Than a High School Diploma	5.2%	1.3%	1.2%
High School Diploma or GED	19.5%	4.0%	2.6%
Some College/Vocational Degree	27.4%	4.8%	3.3%
Bachelor's Degree	14.7%	1.4%	1.2%
Graduate Degree	12.0%	0.3%	1.0%
Mothers' Income			
Low Income	15.8%	4.0%	2.5%
Lower Middle Income	20.8%	4.3%	2.7%
Upper Middle Income	26.6%	2.7%	2.9%
Upper Income	15.6%	0.8%	1.3%
Mothers' Job Prestige			
Low Prestige	39.8%	4.6%	4.1%
High Prestige	39.1%	7.1%	5.3%
Type of Child Care			
Center-Based Care	51.5%	7.4%	6.4%
Relative Care	15.0%	3.5%	2.3%
Non-Relative Care	12.3%	0.9%	0.7%

### **Overall Link Between Mothers' Work Schedules and Children's School Readiness**

The first research question asked whether mothers' work schedules were significantly associated with young children's school readiness. To address this question, a series of Ordinary Least Squares (OLS) regression models were used to predict preschoolers' early reading and mathematics skills, as well as their externalizing behavior problems, from mothers' work schedules. The purpose of these analyses was to extend

previous research by taking a more nuanced approach to the definition of nonstandard work. Specifically, this study distinguished between two types of nonstandard work schedules (i.e., non-day and irregular) and standard work schedules.

In each of the regression models, mothers' work schedules were dummy coded to allow for the inclusion of a categorical variable with more than two groups. The dummy variable representing mothers employed in a standard work schedule was left out of the models and served as the reference category (Wooldridge, 2012). Additionally, a Wald test was performed after each main effects regression model to allow for the statistical comparison of mothers working non-day and irregular work schedules. All main effects regression models were weighted (unstandardized beta coefficients and standard errors are presented in Table 6).

### **Early Reading Skills**

Overall, the first regression model (see Figure 2) indicated that mothers' work schedules were significantly associated with children's early reading skills and accounted for 1.0% of the variance ( $F(2, 3477) = 9.13, p < .001$ ). In particular, children whose mothers worked non-day schedules had significantly lower early reading skills than did children whose mothers worked standard schedules ( $b = -0.20, p < .001$ ). On the contrary, among children whose mothers worked irregular schedules, there was no significant difference in mean early reading skills as compared to children whose mothers worked standard schedules ( $b = -0.02, n.s.$ ). Finally, a Wald test demonstrated that children whose mothers worked a non-day schedule had significantly lower early reading

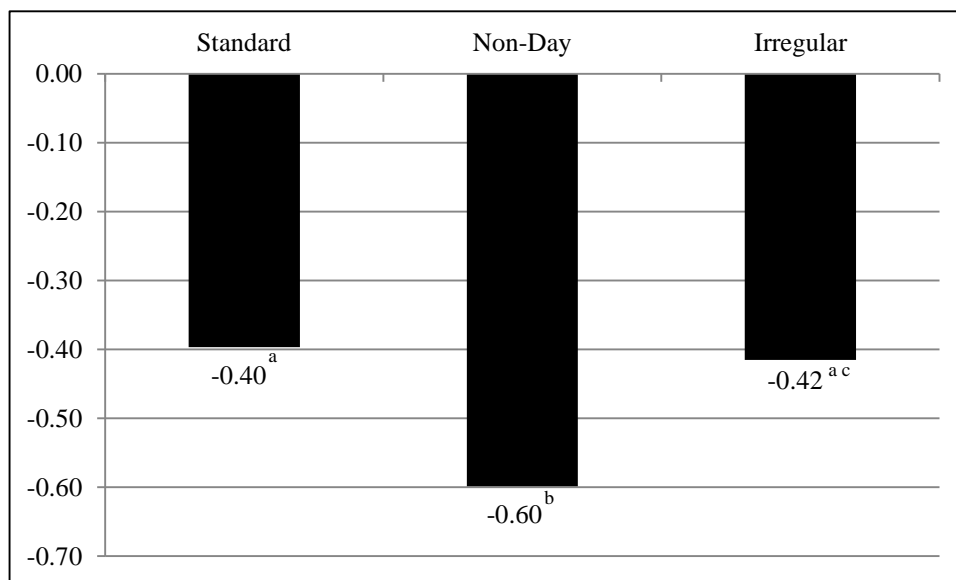
Table 6. Mothers' Work Schedules Predicting Children's Early Academic Skills and Externalizing Behavior Problems

	Reading		Mathematics		Externalizing (Maternal)		Externalizing (ECEP)	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Mothers' Work Schedules								
Standard	Reference Group		Reference Group		Reference Group		Reference Group	
Non-Day	-0.20 ***	(0.05) <sup>a</sup>	-0.20 ***	(0.05)	0.03	(0.04)	0.02	(0.01)
Irregular	-0.02	(0.05) <sup>b</sup>	-0.06	(0.06)	0.00	(0.04)	-0.01	(0.01)

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

<sup>a b</sup> Groups with different letters are different at  $p < 0.05$ .

Figure 2. Mean Differences in Preschoolers' Emergent Reading Skills Across Mothers' Work Schedules

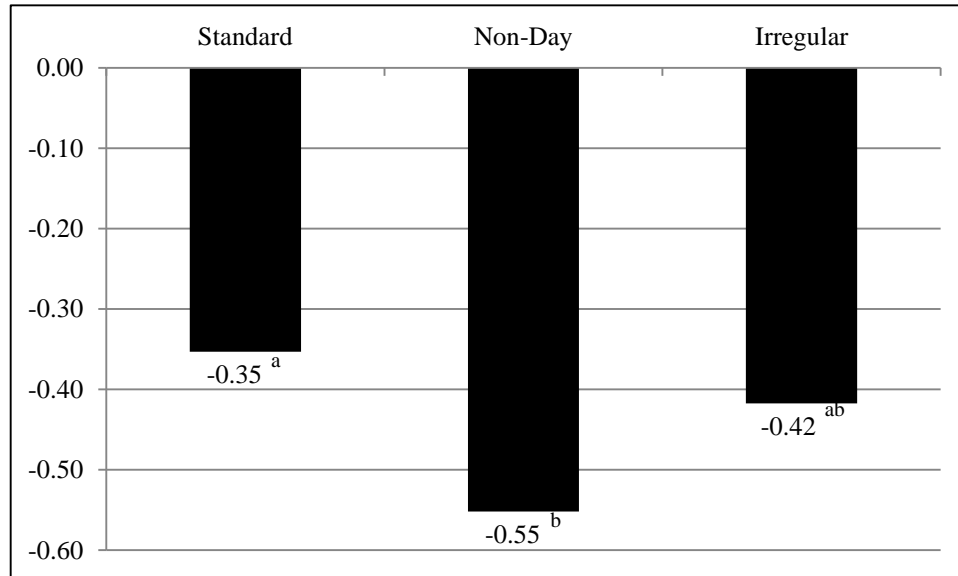


skills relative to children whose mothers worked irregular schedules ( $b = -0.18$ ,  $F(1, 3477) = 7.61$ ,  $p < .05$ ).

### Early Mathematics Skills

A second regression model (see Figure 3) indicated that mothers work schedules were significantly linked to children's early mathematics skills, accounting for 1.0% of the variance ( $F(2, 3477) = 7.92$ ,  $p < .001$ ). Specifically, children whose mothers worked a non-day schedule had significantly lower early mathematics skills as compared to children whose mothers worked a standard schedule ( $b = -0.20$ ,  $p < .001$ ). Among children whose mothers worked an irregular schedule, however, there was no significant difference in mean mathematics skills relative to children whose mothers worked a standard schedule ( $b = -0.06$ , *n.s.*). Furthermore, a Wald test showed that mean early mathematics skills were marginally lower among children whose mothers worked a non-

Figure 3. Mean Differences in Preschoolers' Emergent Mathematics Skills Across Mothers' Work Schedules



day schedule as compared to those whose mothers worked an irregular schedule ( $b = -0.13$ ,  $F(1, 3477) = 3.42$ ,  $p < .10$ ).

### Externalizing Behavior Problems

In addition to children's emergent academic skills, the association between mothers' work schedules and preschoolers' externalizing behavior problems was also investigated. To address the issue of shared method variance, both maternal-report and ECEP-report measures of externalizing behavior problems were regressed onto mothers' work schedules. Results from these regression models indicated that mothers' work schedules were not significantly linked to children's behavior problems, whether they were reported by the mothers themselves ( $F(2, 3477) = 0.33$ ,  $n.s.$ ) or the children's ECEPs ( $F(2, 2876) = 1.81$ ,  $n.s.$ ). Follow up Wald tests showed that there were no significant differences in externalizing problems between children whose mothers



worked non-day or irregular schedules, for mothers' reports and ECEPs' reports, respectively ( $F(1, 3477) = 0.36, n.s.$ ;  $F(1, 2876) = 3.57, n.s.$ ).

### **Addition of Covariates**

As a robustness check, each of these four regression models was next repeated with the inclusion of a list of theoretically and empirically derived child and family characteristics. Expressly, children's gender; mothers' race/ethnicity, education, income, and job prestige; and type of child care were included in the regression models as covariates due to their relation with mothers' work schedules and children's school readiness skills. That is, the purpose of including these covariates in the models was to conduct a more conservative test of the associations of interest by reducing the likelihood of omitted variable bias confounding the coefficient estimate. For all models including covariates, unstandardized beta coefficients and standard errors are reported in Table 7.

Results from the first two regression models including covariates indicated that the predictor variables accounted for 19.7% of the variance in children's early reading skills ( $F(17, 3462) = 28.48, p < .001$ ) and 14.8% of the variance in children's early mathematics skills ( $F(17, 3462) = 22.62, p < .001$ ). After controlling for the child and family characteristics, however, mothers' work schedules were no longer significantly related to children's early reading and mathematics skills. Subsequent Wald tests confirmed that there were no significant differences between the non-omitted groups (i.e., non-day and irregular) for either reading or mathematics skills ( $F_{Reading Skills}(1, 3462) = 0.49, n.s.$ ,  $F_{Mathematics Skills}(1, 3462) = 0.50, n.s.$ ). Similar results were found for the remaining two regression models such that the predictor variables accounted for 5.0% of

Table 7. Mothers' Work Schedules Predicting Children's Early Academic Skills and Externalizing Behavior Problems with Covariates

	Reading		Mathematics		Externalizing (Maternal)		Externalizing (ECEP)	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Mothers' Work Schedules								
Standard	Reference Group		Reference Group		Reference Group		Reference Group	
Non-Day	-0.06	(0.04)	-0.06	(0.05)	-0.01	(0.04)	0.00	(0.01)
Irregular	0.03	(0.05)	-0.02	(0.05)	-0.02	(0.03)	-0.02	(0.01)
Male	-0.15 ***	(0.03)	-0.08 *	(0.03)	0.18 ***	(0.02)	0.07 ***	(0.01)
Mothers' Race/Ethnicity								
White, Non-Hispanic	Reference Group		Reference Group		Reference Group		Reference Group	
Hispanic	-0.26 ***	(0.04)	-0.18 ***	(0.05)	-0.08 *	(0.03)	0.00	(0.01)
Black, Non-Hispanic	-0.07	(0.04)	-0.08 +	(0.04)	-0.03	(0.03)	-0.01	(0.01)
Asian or Pacific Islander	0.16 **	(0.06)	0.22 ***	(0.06)	-0.02	(0.05)	-0.03 **	(0.01)
Other Race/Ethnicity	-0.04	(0.09)	-0.04	(0.10)	0.09 +	(0.05)	0.04 *	(0.02)
Mothers' Education								
Less Than a High School Diploma	Reference Group		Reference Group		Reference Group		Reference Group	
High School Diploma or GED	0.02	(0.06)	-0.10	(0.07)	-0.01	(0.06)	0.00	(0.02)
Some College/Vocational Degree	0.17 **	(0.06)	0.05	(0.07)	-0.05	(0.06)	-0.01	(0.02)
Bachelor's Degree	0.33 ***	(0.07)	0.23 **	(0.08)	-0.02	(0.06)	0.00	(0.02)
Graduate Degree	0.48 ***	(0.08)	0.27 **	(0.09)	-0.11 +	(0.07)	-0.01	(0.02)
Level of Income								
Low Income	Reference Group		Reference Group		Reference Group		Reference Group	
Lower Middle Income	0.20 ***	(0.04)	0.23 ***	(0.05)	-0.04	(0.04)	-0.02 +	(0.01)
Upper Middle Income	0.24 ***	(0.04)	0.27 ***	(0.05)	-0.09 *	(0.04)	-0.04 ***	(0.01)
Upper Income	0.34 ***	(0.05)	0.35 ***	(0.06)	-0.12 **	(0.04)	-0.05 **	(0.01)
Mothers' Job Prestige	-0.02	(0.03)	-0.03	(0.04)	0.03	(0.03)	0.00	(0.01)
Type of Child Care								
Center-Based Care	Reference Group		Reference Group		Reference Group		Reference Group	
Relative Care	-0.13 ***	(0.04)	-0.17 ***	(0.04)	0.01	(0.03)	0.05 ***	(0.01)
Non-Relative Care	-0.19 ***	(0.04)	-0.16 **	(0.05)	0.03	(0.03)	0.05 ***	(0.01)

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

the variance in mothers' reports of children's problem behaviors ( $F(17, 3462) = 7.03, p < .001$ ) and 8.7% of the variance in ECEP-reports of preschoolers' externalizing behaviors ( $F(17, 2861) = 10.75, p < .001$ ). Once again, after controlling for the covariates, mothers' work schedules were no longer significantly associated with either measure of children's externalizing behavior problems. Once again, Wald tests also found no significant differences in either measure of externalizing symptoms ( $F_{\text{Maternal-Report}}(1, 3462) = 0.02, n.s., F_{\text{ECEP-Report}}(1, 2861) = 1.76, n.s.$ ).

Across all four regression models, children's gender was a significant predictor of school readiness. Specifically, boys (as compared to girls) had lower reading ( $b = -0.15, p < .001$ ) and mathematics skills ( $b = -0.08, p < .05$ ) than did girls, and boys had higher externalizing problems than did girls for both measures of problem behaviors ( $b_{\text{Maternal-Report}} = 0.18, p < .001; b_{\text{ECEP-Report}} = 0.07, p < .001$ ). Additionally, mothers' income was also found to be linked such that children's early reading and mathematics skills were higher and externalizing problems were lower among children whose mothers were in the upper middle and upper income brackets, relative to children whose mothers were in the low income category (see Table 7).

### **The Moderating Roles of Mothers' Job and Family Characteristics**

In addition to examining the overall link between mothers' work schedules and young children's school readiness, the second and third research questions asked whether these associations depended upon mothers' job and family characteristics. Specifically, in terms of job characteristics, the moderating role of mothers' work hours was investigated. Additionally, regarding family characteristics, analyses were conducted to

test whether family structure modified the linkage between work schedules and children's readiness for school.

These research questions were addressed using a traditional multiple regression-based approach to moderation (Aiken & West, 1991; Cohen & Cohen, 1983; Holmbeck, 1997, 2002). When testing for moderated effects between a categorical predictor variable (i.e., mothers' work schedules) and a continuous moderator (e.g., mothers' work hours), a significant interaction indicates that the differences between the group means of the levels of the categorical variable differ according to the level of the moderator. In regression, interactions between categorical and continuous variables are formed by multiplying the continuous variable by each level of the dummy variables representing the categorical variable (Aiken & West, 1991).

Importantly, a significant joint (omnibus) test simply indicates that there is a moderated effect (i.e., an overall difference in the slopes of the regression lines), but it does not provide specific information about the nature of the interaction (Aiken & West, 1992; Holmbeck, 2002). Therefore, post-hoc probing of interaction effects is necessary to interpret any significant findings. In this study, significant interactions were probed by computing simple slopes, which involves comparing the slopes of the outcome on the predictor when the moderator is held constant at different combinations of high and low values (i.e., 1 standard deviation above and below the mean). As described by Aiken and West (1991), when conducting simple slopes analysis for interactions including categorical variables, the coefficient for the main effect of the continuous variable and its significance test represent the simple slope for the reference group. Therefore, for

significant interactions, regression models were conducted in which each of the three groups (i.e., standard, non-day, and irregular) in turn served as the reference group to provide tests of the three simple slopes corresponding to each of the work schedule types (Cohen & Cohen, 1983).

### **Mothers' Work Hours**

To test the moderating role of mothers' work hours, a series of four regression models were conducted (see Table 8). For each regression model, the predictors included dummy variables representing mothers' work schedules (with standard schedules left out of the model to serve as the reference group), a variable reflecting mothers' work hours, and two interaction terms (i.e., one for each non-omitted work schedule type). Per the recommendation of Aiken and West (1991), mothers' work hours was centered by subtracting the mean from each score. Regarding the interaction terms, mothers' work hours was multiplied by each of the dummy variables representing mothers' work schedules.

**Early reading skills.** The first regression model predicted children's early reading skills ( $F(5,3474) = 8.19, p < .001$ ). Findings from the regression model suggested that there was no evidence of a significant difference in slopes between children whose mothers worked non-day schedules versus standard schedules across work hours ( $b = -0.00, n.s.$ ). Similarly, there were no significant differences in slopes between children whose mothers worked irregular schedules relative to standard ( $b = -0.01, n.s.$ ) or relative to non-day schedules ( $b = -0.00, n.s.$ ). In the absence of a significant interaction, no further steps were taken in terms of post-hoc probing.

Table 8. Mothers' Work Schedules x Work Hours Full Interaction Model

	Reading		Mathematics		Externalizing (Maternal)		Externalizing (ECEP)	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Mothers' Work Schedules								
Standard	Reference Group		Reference Group		Reference Group		Reference Group	
Non-Day	-0.23 ***	(0.05)	-0.22 ***	(0.05)	0.04	(0.04)	0.02	(0.01)
Irregular	-0.06	(0.05)	-0.10	(0.06)	0.00	(0.04)	-0.01	(0.01)
Mothers' Work Hours	0.00 **	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00 *	(0.00)
Standard x Work Hours	Reference Group		Reference Group		Reference Group		Reference Group	
Non-Day x Work Hours	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Irregular x Work Hours	-0.01	(0.00)	-0.01 *	(0.00)	0.00	(0.00)	0.00	(0.00)

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

**Early mathematics skills.** The second regression model predicted children's early mathematics skills ( $F(5,3474) = 5.37, p < .001$ ). There was a significant difference between mothers who worked an irregular schedule (relative to a standard schedule ( $b = -0.01, p < .05$ )). To aid in the interpretation of this significant finding, post-hoc probing using simple slopes was conducted to determine if the simple slopes for the standard and irregular work schedules groups each differed from zero. Results from these regression models suggested that among children whose mothers were employed in an irregular work schedule, mothers' work hours had a significant negative association with early mathematics skills ( $b = -0.01, p < .01$ ). In contrast, results from the simple slopes tests for the standard work schedule group was not significant ( $b = -0.00, n.s.$ ).

**Externalizing behavior problems.** Mothers' reports of children's externalizing behavior problems were predicted in a third regression model ( $F(5, 3474) = 0.45, n.s.$ ). For the final regression model predicting ECEPs' reports of children's behavior problems ( $F(5, 2864) = 3.04, p < .05$ ), there was no evidence of a significant interaction, as the slopes were not significantly different between mothers who worked non-day schedules relative to standard schedules ( $b = 0.00, n.s.$ ) or between mothers who worked irregular schedules as compared to those who worked standard schedules ( $b = -0.00, n.s.$ ) or non-day ( $b = 0.00, n.s.$ ). In the absence of a significant interaction effect, no post-hoc steps were taken.

**Addition of covariates.** After the inclusion of covariates in the regression models, none of the interactions remained significant (see Table 9). As a result, no further steps were taken with respect to post-hoc probing. Taken together, these findings

Table 9. Mothers' Work Schedules x Work Hours Full Interaction Model with Covariates

	Reading		Mathematics		Externalizing (Maternal)		Externalizing (ECEP)	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Mothers' Work Schedules								
Standard	Reference Group		Reference Group		Reference Group		Reference Group	
Non-Day	-0.06	(0.05)	-0.06	(0.05)	-0.01	(0.04)	0.01	(0.01)
Irregular	0.02	(0.05)	-0.03	(0.05)	-0.02	(0.04)	-0.02	(0.01)
Mothers' Work Hours	0.00 *	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00 *	(0.00)
Standard x Work Hours	Reference Group		Reference Group		Reference Group		Reference Group	
Non-Day x Work Hours	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Irregular x Work Hours	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Male	-0.15 ***	(0.03)	-0.08 *	(0.03)	0.18 ***	(0.02)	0.07 ***	(0.01)
Mothers' Race/Ethnicity								
White, Non-Hispanic	Reference Group		Reference Group		Reference Group		Reference Group	
Hispanic	-0.25 ***	(0.04)	-0.17 ***	(0.05)	-0.08 *	(0.03)	0.00	(0.01)
Black, Non-Hispanic	-0.06	(0.04)	-0.08 +	(0.04)	-0.03	(0.03)	-0.01	(0.01)
Asian or Pacific Islander	0.16 **	(0.06)	0.22 ***	(0.06)	-0.02	(0.05)	-0.03 **	(0.01)
Other Race/Ethnicity	-0.04	(0.09)	-0.04	(0.10)	0.09 +	(0.05)	0.04 *	(0.02)
Mothers' Education								
Less Than a High School Diploma	Reference Group		Reference Group		Reference Group		Reference Group	
High School Diploma or GED	0.03	(0.06)	-0.09	(0.07)	-0.01	(0.06)	0.00	(0.02)
Some College/Vocational Degree	0.17 **	(0.06)	0.05	(0.07)	-0.05	(0.06)	-0.01	(0.02)
Bachelor's Degree	0.32 ***	(0.07)	0.22 **	(0.08)	-0.02	(0.06)	0.00	(0.02)
Graduate Degree	0.48 ***	(0.08)	0.27 **	(0.09)	-0.11 +	(0.07)	-0.01	(0.02)
Level of Income								
Low Income	Reference Group		Reference Group		Reference Group		Reference Group	
Lower Middle Income	0.20 ***	(0.04)	0.23 ***	(0.05)	-0.04	(0.04)	-0.02 *	(0.01)
Upper Middle Income	0.24 ***	(0.04)	0.27 ***	(0.05)	-0.09 *	(0.04)	-0.04 ***	(0.01)
Upper Income	0.35 ***	(0.05)	0.35 ***	(0.06)	-0.12 **	(0.04)	-0.05 ***	(0.01)
Mothers' Job Prestige	-0.03	(0.03)	-0.04	(0.04)	0.03	(0.03)	0.00	(0.01)
Type of Child Care								
Center-Based Care	Reference Group		Reference Group		Reference Group		Reference Group	
Relative Care	-0.12 **	(0.04)	-0.17 ***	(0.04)	0.01	(0.03)	0.04 ***	(0.01)
Non-Relative Care	-0.19 ***	(0.04)	-0.16 **	(0.05)	0.03	(0.03)	0.04 ***	(0.01)

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .



indicate that the association between mothers' work schedules and young children's school readiness did not depend upon work hours, above and beyond the covariates.

### **Family Structure**

Next, the moderating role of family structure was tested using the same procedure outlined for mothers' work hours (see Table 10).

**Early reading skills.** The first regression model predicting children's early reading skills ( $F(5, 3474) = 18.66, p < .001$ ) found no evidence of a significant interaction between work schedules and family structure, therefore no post-hoc steps were taken.

**Early mathematics skills.** A second regression model predicting children's early mathematics skills ( $F(5, 3474) = 16.95, p < .001$ ) found a significant difference for mothers who worked an irregular schedule as compared to those who worked a standard schedule ( $b = 0.31, p < .01$ ). Post-hoc regression analyses revealed that the simple slopes for the standard and irregular work schedules groups each differed from zero ( $b_{Standard} = 0.24, p < .001$ ;  $b_{Irregular} = 0.56, p < .001$ ).

**Externalizing behavior problems.** The overall regression model predicting mothers' reports of children's externalizing behavior problems only approached significance ( $F(5, 3474) = 2.15, p < .10$ ). In contrast, the fourth regression model predicting ECEPs' reports of children's behavior problems ( $F(5, 2862) = 6.22, p < .001$ ), revealed no evidence of a significant interaction, as the slopes were not significantly different between mothers who worked non-day schedules relative to standard schedules ( $b = 0.00, n.s.$ ) or between mothers who worked irregular schedules as

Table 10. Mothers' Work Schedules x Family Structure Full Interaction Model

	Reading		Mathematics		Externalizing (Maternal)		Externalizing (ECEP)	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Mothers' Work Schedules								
Standard	Reference Group		Reference Group		Reference Group		Reference Group	
Non-Day	-0.18 ***	(0.05)	-0.17 **	(0.05)	0.03	(0.04)	0.02	(0.01)
Irregular	-0.04	(0.05)	-0.08	(0.05)	0.00	(0.04)	-0.01	(0.01)
Mothers' Family Structure	0.28 ***	(0.03)	0.28 ***	(0.04)	-0.06 *	(0.03)	-0.04 ***	(0.01)
Standard x Family Structure	Reference Group		Reference Group		Reference Group		Reference Group	
Non-Day x Family Structure	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Irregular x Family Structure	-0.01 **	(0.00)	-0.01 *	(0.00)	0.00	(0.00)	0.00	(0.00)

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

compared to those who worked standard schedules ( $b = 0.00, n.s.$ ). In the absence of a significant interaction effect, no further steps were taken.

**Addition of covariates.** After the inclusion of covariates, the interaction between mothers' work schedules and family structure remained significant for children's early mathematics skills (see Table 11). Specifically, the slopes were different for mothers who worked an irregular schedule as compared to those who worked a standard schedule ( $b = 0.26, p < .01$ ), above and beyond the covariates. Post-hoc regression analyses revealed that only the simple slopes for the irregular work schedules group differed from zero ( $b_{Standard} = 0.02, n.s.$ ;  $b_{Irregular} = 0.25, p < .05$ ). For the other three school readiness outcomes, there were no significant interaction findings after controlling for the covariates. Due to these non-significant findings, no further steps were taken to conduct post-hoc analyses with covariates. As a whole, these results indicate that the association between mothers' work schedules and children's school readiness does not depend on family structure, above and beyond the covariates.

### **The Mediating Roles of Mothers' Depressive Symptoms and Parenting Practices**

After examining whether the link between mothers' work schedules and young children's school readiness differs across subgroups, research questions four through seven investigated potential mechanisms that might underlie the association of interest in this study. More specifically, the current study tested whether mothers' work schedules were indirectly related to children's readiness for school through mothers' depressive symptoms and two indicators of positive parenting (i.e., cognitive stimulation and emotional supportiveness). Finally, mothers' depressive symptoms and positive

Table 11. Mothers' Work Schedules x Family Structure Full Interaction Model with Covariates

	Reading		Mathematics		Externalizing (Maternal)		Externalizing (ECEP)	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Mothers' Work Schedules								
Standard	Reference Group		Reference Group		Reference Group		Reference Group	
Non-Day	-0.06	(0.05)	-0.06	(0.05)	-0.03	(0.04)	0.00	(0.01)
Irregular	0.04	(0.05)	-0.01	(0.05)	-0.02	(0.03)	-0.02	(0.01)
Mothers' Family Structure	0.01	(0.04)	-0.02	(0.05)	0.01	(0.03)	-0.03 **	(0.01)
Standard x Family Structure	Reference Group		Reference Group		Reference Group		Reference Group	
Non-Day x Family Structure	0.00	(0.09)	0.07	(0.10)	-0.15 +	(0.07)	-0.02	(0.02)
Irregular x Family Structure	0.08	(0.10)	0.26 *	(0.12)	-0.08	(0.07)	0.00	(0.02)
Male	-0.15 ***	(0.03)	-0.08 *	(0.03)	0.18 ***	(0.02)	0.07 ***	(0.01)
Mothers' Race/Ethnicity								
White, Non-Hispanic	Reference Group		Reference Group		Reference Group		Reference Group	
Hispanic	-0.26 ***	(0.04)	-0.17 ***	(0.05)	-0.08 *	(0.03)	0.00	(0.01)
Black, Non-Hispanic	-0.06	(0.04)	-0.08 +	(0.05)	-0.03	(0.03)	-0.02 +	(0.01)
Asian or Pacific Islander	0.16 **	(0.06)	0.21 ***	(0.06)	-0.02	(0.05)	-0.03 **	(0.01)
Other Race/Ethnicity	-0.04	(0.09)	-0.04	(0.10)	0.09	(0.05)	0.03 *	(0.02)
Mothers' Education								
Less Than a High School Diploma	Reference Group		Reference Group		Reference Group		Reference Group	
High School Diploma or GED	0.02	(0.06)	-0.10	(0.07)	-0.01	(0.06)	0.00	(0.02)
Some College/Vocational Degree	0.17 **	(0.06)	0.05	(0.07)	-0.05	(0.06)	-0.01	(0.02)
Bachelor's Degree	0.33 ***	(0.07)	0.22 **	(0.08)	-0.02	(0.06)	0.00	(0.02)
Graduate Degree	0.48 ***	(0.08)	0.27 **	(0.09)	-0.11	(0.07)	0.00	(0.02)
Mothers' Level of Income								
Low Income	Reference Group		Reference Group		Reference Group		Reference Group	
Lower Middle Income	0.19 ***	(0.04)	0.22 ***	(0.05)	-0.03	(0.04)	-0.01	(0.01)
Upper Middle Income	0.23 ***	(0.05)	0.26 ***	(0.06)	-0.08 *	(0.04)	-0.03 *	(0.01)
Upper Income	0.33 ***	(0.06)	0.35 ***	(0.07)	-0.12 *	(0.05)	-0.04 *	(0.01)
Mothers' Job Prestige	-0.02	(0.03)	-0.03	(0.03)	0.03	(0.03)	0.00	(0.01)
Type of Child Care								
Center-Based Care	Reference Group		Reference Group		Reference Group		Reference Group	
Relative Care	-0.13 ***	(0.04)	-0.16 ***	(0.04)	0.01	(0.03)	0.04 ***	(0.01)
Non-Relative Care	-0.19 ***	(0.04)	-0.16 **	(0.05)	0.03	(0.03)	0.05 ***	(0.01)

Note. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

parenting were examined as successive mediators of the relation between work arrangements and preschoolers' development.

In accordance with contemporary recommendations, the indirect pathways of interest were estimated via bootstrapping (Fritz & McKinnon, 2007; Hayes, 2009, 2012; Hayes, Preacher & Myers, 2011; Shrout & Bolger, 2002; Zhao, Lynch, & Chen, 2010). Scholars recognize bootstrapping as one of the most valid and powerful methods available for testing mediation (Kenny, 2008; McKinnon, Lockwood, & Williams, 2004; Williams & McKinnon, 2008). In particular, bootstrapping empirically estimates the indirect effect itself, rather than inferring its existence from a series of hypothesis tests of the component paths making up the effect (Hayes, 2009). Since it is possible for an indirect effect to exist even when one of its constituent paths is not different from zero, bootstrapping reduces the likelihood of a Type II error as compared to the method that relies on estimates of each of the paths that make up a mediation model, which is otherwise known as the *causal steps approach* (Baron & Kenny, 1986).

In practice, bootstrapping is a computationally intensive approach to mediation analysis that involves using the original dataset of  $N$  cases as a “population reservoir” from which the computer draws a large number (e.g., 5,000 – 10,000) of random samples with replacement (Mallinckrodt, Abraham, Wei, & Russell, 2006; Shrout & Bolger, 2002). This means that the probability of any particular case being selected remains equal at every subsequent draw. For each of these bootstrap samples, the indirect effect is calculated, and the resulting empirical distribution is used to estimate a confidence interval for the indirect effect (Mallinckrodt et al., 2006; Preacher & Hayes, 2004, 2008).

If zero is not found between the lower and upper bounds of the confidence interval, then the indirect effect is considered significantly different from zero (Hayes, 2009, 2012). Additionally, instead of providing a single indirect effect as is the case when using continuous variables as predictors of interest in mediation models, *relative indirect effects* for different categories are estimated and bootstrapped when the predictor variable is multicategorical. Specifically, in this study, there were 3 relative indirect effects: 1) non-day as compared to standard, 2) irregular as compared to standard, and 3) irregular as compared to non-day (Hayes, 2013).

For the current study, bootstrapped mediation analyses were conducted on unweighted data as the Stata ‘bootstrap’ command requires bootstrap replicate weights, which were not included in the ECLS-B data. Specifically, an SPSS macro designed for SPSS called PROCESS (Hayes, 2013) was used to generate bootstrap bias corrected (BC) confidence intervals (CIs, 95%), as they result in better Type I error rates and power as compared to conventional CIs (Preacher, Rucker, & Hayes, 2007; Preacher & Hayes, 2008). All bootstrapped effects are based on a bootstrap sample of  $n = 5,000$  as per modern recommendations (Hayes, 2012, 2013).

Next, as a robustness check, the mediating effects of interest were also tested via the product of coefficients approach, which could be estimated using weights. The most common product of coefficients test is the Sobel method (Sobel, 1982, 1986), which is itself an improvement over the causal steps approach in that it estimates the second and third pathways in the causal steps approach and then tests the significance of the indirect effect directly (McKinnon, Fairchild, & Fritz, 2007). Importantly, the Sobel method can

be problematic among small samples ( $N < 400$ ), where the sampling distribution tends to be asymmetric, with positive skewness and nonzero kurtosis (Bollen & Stine, 1990; Stone & Sobel, 1990). In studies with large samples such as those drawn from the ECLS-B, this concern is less pressing and its results may lend credence to the bootstrapping findings and vice versa (Fritz, Taylor, & McKinnon, 2012; Hayes, 2009).

### **Mothers' Depressive Symptoms**

With respect to the mediation models of interest in this study, mothers' depressive symptoms were first investigated as a single mediating factor. More specifically, research question four asked whether the relation between mothers' work schedules and children's school readiness was mediated by mothers' depressive symptoms. A summary of the mediation results via bootstrapping is presented in Table 12.

**Early reading skills.** For children's early reading skills, bootstrapped mediation results provided evidence for the existence of a mediation effect. That is, results indicated there was a relative indirect effect of non-day work schedules (relative to standard schedules) on children's reading skills through depressive symptoms (BC lower = -.0291, BC upper = -.0094), as zero was not contained within the lower and upper limits. Similarly, as compared to standard work schedules, the relation between mothers' irregular work schedules and early reading skills was found to be indirectly associated via depressive symptoms (BC lower = -.0262, BC upper = -.0057). In contrast, there was no support for an indirect effect between mothers' irregular work schedules (relative to non-day schedules) and reading skills through depressive symptoms as zero was within the lower and upper bounds (BC lower = -.0078, BC upper = .0150). Collectively, these

Table 12. Bootstrap Indirect Effects of Mothers' Work Schedules on Children's School Readiness Through Depression

Model (Pathway)	BC Lower	BC Upper	With Covariates	
			BC Lower	BC Upper
WS → DEP → READ				
NDY (STD) → DEP → READ	-.0291	-.0094	-.0068	-.0003
IRR (STD) → DEP → READ	-.0262	-.0057	-.0073	-.0003
IRR (NDY) → DEP → READ	-.0078	.0150	-.0030	.0034
WS → DEP → MATH				
NDY (STD) → DEP → MATH	-.0325	-.0106	-.0089	-.0002
IRR (STD) → DEP → MATH	-.0296	-.0064	-.0095	-.0001
IRR (NDY) → DEP → MATH	-.0092	.0168	-.0042	.0045
WS → DEP → EXT <sup>1</sup>				
NDY (STD) → DEP → EXT <sup>1</sup>	.0153	.0412	.0016	.0245
IRR (STD) → DEP → EXT <sup>1</sup>	.0091	.0382	.0001	.0249
IRR (NDY) → DEP → EXT <sup>1</sup>	-.0227	.0127	-.0152	.0154
WS → DEP → EXT <sup>2</sup>				
NDY (STD) → DEP → EXT <sup>2</sup>	.0014	.0057	.0001	.0029
IRR (STD) → DEP → EXT <sup>2</sup>	.0005	.0046	-.0003	.0023
IRR (NDY) → DEP → EXT <sup>2</sup>	-.0037	.0010	-.0023	.0009

*Note.* WS = Mothers' work schedules, NDY (STD) = Relative indirect effect of non-day vs. standard schedules, IRR (STD) = Relative indirect effect of irregular vs. standard schedules, IRR (NDY) = Relative indirect effect of irregular vs. non-day schedules, DEP = Mothers' depressive symptoms, READ = Children's early reading skills, MATH = Children's early mathematics skills, EXT<sup>1</sup> = Mothers' reports of externalizing problems, EXT<sup>2</sup> = ECEPs' reports of externalizing problems. Significant indirect effects are in bold.

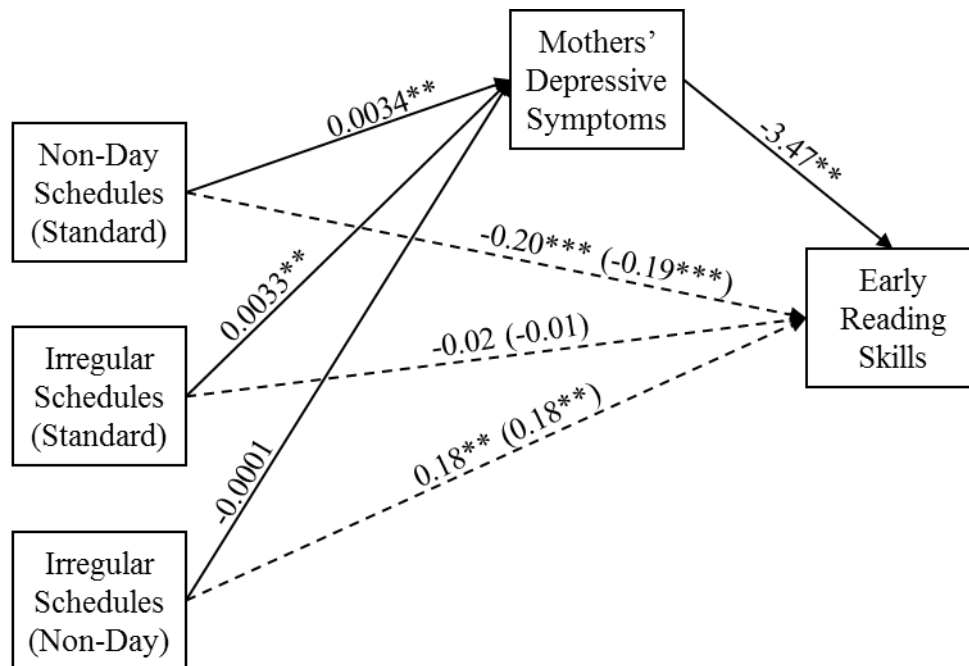
results indicate that mothers working non-day and irregular schedules (relative to standard schedules) reported higher levels of depressive symptoms, which were then linked to children's lower reading skills.

Next, as a robustness check, the mediating role of mothers' depressive symptoms was tested again with weighted models using regression (see Figure 4). To do so, mothers' depressive symptoms were first regressed onto work schedules, which demonstrated that, relative to mothers who worked a standard schedule, mothers who



worked a non-day schedule reported higher levels of depressive symptoms ( $a_1 = 0.0034$ ,  $p < .01$ ), as did mothers who worked an irregular schedule ( $a_2 = 0.0033$ ,  $p < .01$ ). A second regression model testing the relation between depressive symptoms and children's early reading skills (while controlling for work schedules) found that mothers' depressive symptoms were negatively associated with children's achievement ( $b = -3.47$ ,  $p < .01$ ), as expected.

Figure 4. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and Children's Early Reading Skills



Next, a post-hoc Sobel test indicated that there was a significant relative indirect effect of non-day schedules (relative to standard) on children's reading skills via depressive symptoms ( $z = -2.27$ ,  $p < .05$ ). Similarly, another Sobel test found a significant indirect effect of irregular schedules (relative to standard) on children's reading skills through mothers' depressive symptoms ( $z = -2.05$ ,  $p < .05$ ). In terms of

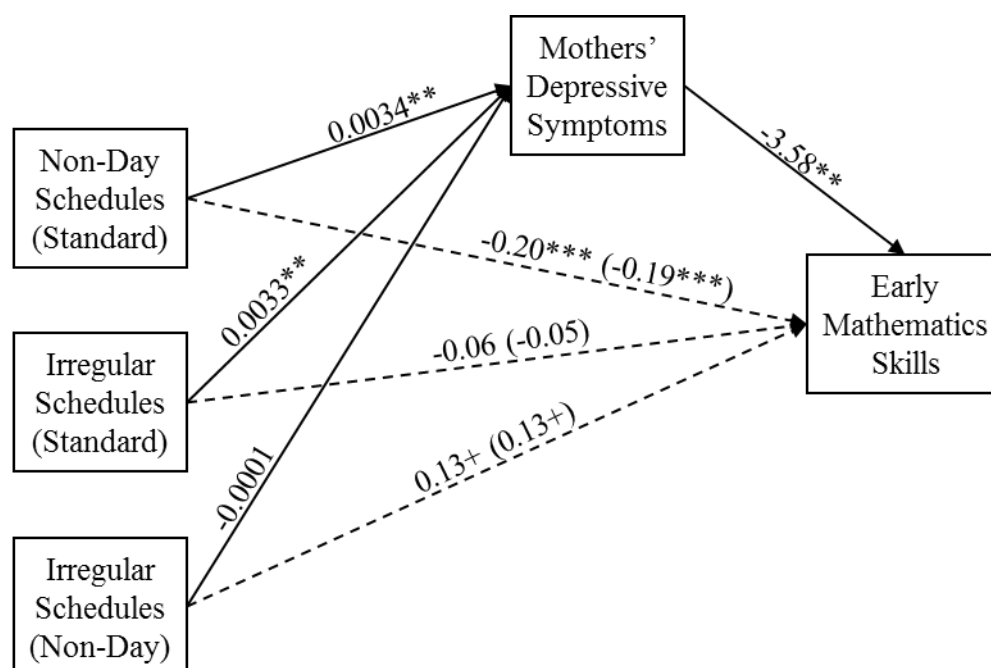
mothers' non-day schedules vs. irregular schedules, however, there was no evidence of mediation. As a whole, these results were consistent with those found via bootstrapping, and therefore they provide additional evidence in support of significant mediation.

**Early mathematics skills.** With respect to children's mathematics skills, the results from the bootstrapped analyses revealed evidence of a mediating effect for both mothers' non-day and irregular work schedules (both relative to standard work schedules) on children's early mathematics skills through depressive symptoms (BC lower = -.0325, BC upper = -.0106; BC lower = -.0296, BC upper = -.0064, respectively). There was not, however, evidence of mediation when the association between mothers' irregular work schedules (relative to non-day schedules) with mathematics skills was considered to be indirectly associated through depressive symptoms (BC lower = -.0092, BC upper = .0168). Overall, these findings are similar to those seen with children's early reading skills, and they demonstrate that mothers working non-day and irregular work schedules (both relative to standard schedules) reported higher levels of depressive symptoms, and subsequently, children's early mathematics scores were lower.

Consistent with these findings, the results from the weighted models using regression models also found evidence of relative indirect effects (see Figure 5). Results from a regression model predicting mothers' depressive symptoms from work schedules were identical to those presented for children's early reading skills. The second regression model found that mothers' depressive symptoms were also negatively associated with children's early mathematics skills ( $b = -3.58, p < .01$ ). Next, post-hoc Sobel tests indicated that there was a significant relative indirect effect of non-day work

schedules (relative to standard schedules) on children's early mathematics skills via mothers' depressive symptoms ( $z = -2.27, p < .05$ ). Also, there was a significant relative indirect effect for mothers' irregular schedules (relative to standard schedules) through depressive symptoms ( $z = -2.05, p < .05$ ). In general, the findings from both bootstrapping and the Sobel approach indicate the mothers' depressive symptoms mediate the linkage between work schedules and children's early mathematics skills.

Figure 5. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and Children's Early Mathematics Skills

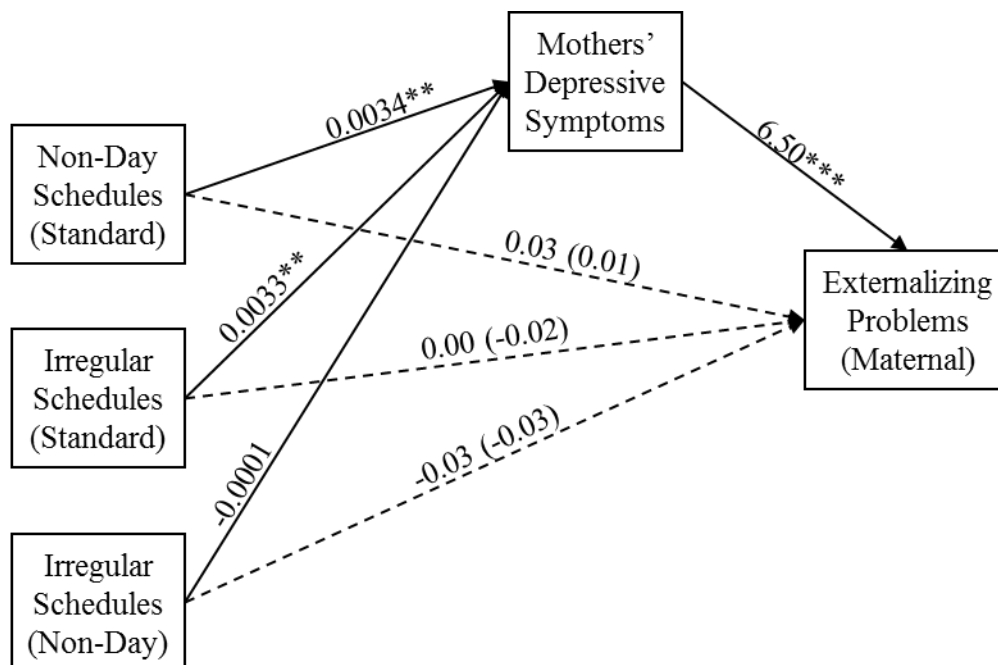


**Mothers' reports of externalizing behaviors.** In addition to children's early academic skills, mediation models including measures of children's socioemotional adjustment difficulties were also estimated. Findings from this set of analyses showed that zero did not fall between the lower and upper limits when the associations between

mothers' non-day and irregular work schedules (both relative to standard work schedules) with children's problem behaviors were investigated as indirectly associated through depressive symptoms (BC lower = .0153, BC upper = .0412; BC lower = .0091, BC upper = .0382, respectively). On the other hand, zero was contained within the lower and upper limits when the relation between mothers' irregular work schedules (relative to non-day schedules) with problem behaviors was thought to be indirectly associated through depressive symptoms (BC lower = -.0227, BC upper = .0127). Taken together, this suggests that mothers working non-day and irregular work schedules (both relative to standard schedules) reported higher levels of depressive symptoms, which were in turn related to children's higher problem behaviors.

These findings were corroborated by the weighted analyses using regression followed by post-hoc Sobel tests (see Figure 6). Expressly, these regression analyses found that mothers' depressive symptoms were positively associated with children's problem behaviors as reported by the mothers themselves ( $b = 6.50$ ,  $p < .001$ ). Sobel tests indicated that there were significant relative indirect effects for both non-day and irregular work schedules (both as compared to standard) on children's externalizing problems through mothers' depressive symptoms ( $z_{\text{Non-Day Schedules}} = 2.91$ ,  $p < .05$ ;  $z_{\text{Irregular Schedules}} = 2.48$ ,  $p < .05$ ). There was not a significant indirect effect, however, for mothers' non-day schedules (relative to irregular schedules ( $z = 0.59$ , *n.s.*)).

Figure 6. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and Mothers' Reports of Children's Externalizing Problems

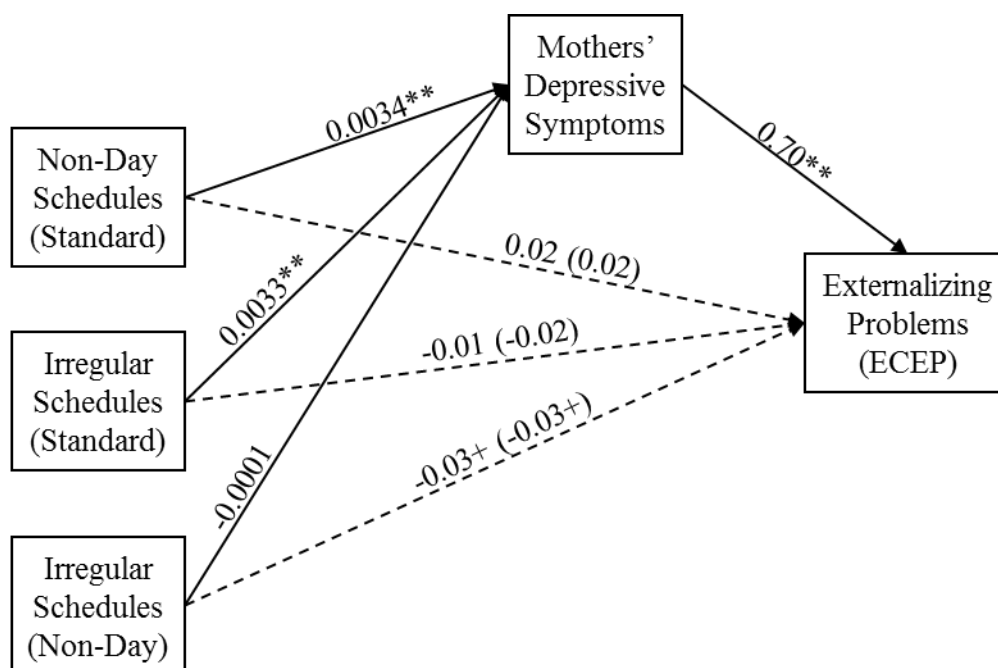


**ECEPs' reports of externalizing behavior problems.** In terms of ECEPs' reports of children's problem behaviors, there was evidence of a mediating effect when the associations for mothers' non-day and irregular work schedules (both relative to standard work schedules) and children's problem behaviors were tested as indirectly linked through depressive symptoms (BC lower = .0014, BC upper = .0057; BC lower = .0005, BC upper = .0046, respectively). In contrast, zero was in the range of the lower and upper limits when the linkage between mothers' irregular work schedules (relative to non-day schedules) with problem behaviors was hypothesized to be indirectly associated through depressive symptoms (BC lower = -.0037, BC upper = .0010). This suggests that mothers working non-day and irregular work schedules (both relative to standard

schedules) reported higher levels of depressive symptoms, which were then associated with children's higher problem behaviors, as reported by their ECEPs.

The weighted regression findings were partially consistent with the results found for bootstrapping (see Figure 7).

Figure 7. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and ECEPs' Reports of Children's Externalizing Problems



That is, mothers' depressive symptoms were positively associated with ECEP-reported externalizing behaviors ( $b = 0.70$ ,  $p < .01$ ). Post-hoc Sobel tests corroborated the bootstrapping findings for a significant relative indirect effect of non-day work schedules (relative to standard) on children's externalizing problems through mothers' depressive symptoms ( $z = 2.04$ ,  $p < .05$ ). For irregular schedules (relative to standard), however, the relative indirect effect was only marginally consistent ( $z = 1.93$ ,  $p < .10$ ), whereas the bootstrapped results found it to be statistically significant. Also in line with the

bootstrapped findings, there was no evidence of a relative indirect effect of mothers' non-day work schedules (compared to irregular schedules) on children's problem behaviors through depressive symptoms ( $z = 1.65$ , *n.s.*).

### **Mothers' Cognitive Stimulation**

Next, research question five asked whether mothers' work schedules were indirectly related to children's school readiness through mothers' cognitive stimulation. As cognitive stimulation was one of two indicators of positive parenting practices, it was tested as using multiple mediator models. Specifically, MacKinnon's (2008) simple extension of Baron and Kenny's (1986) mediation criteria were used where models testing cognitive stimulation as a mediator controlled for the other indicator of positive parenting (i.e., emotional supportiveness). All bootstrapped effects are summarized in Table 13.

**Early reading skills.** The first series of bootstrapped results provided some evidence of a mediating effect of cognitive stimulation. That is, zero did not fall within the lower and upper limits when the association between mothers' non-day work schedules (relative to standard work schedules) with children's early reading skills was tested as being indirectly associated through cognitive stimulation (BC lower = -.0248, BC upper = -.0071). In contrast, there was no evidence of a relative indirect effect when the links between mothers' irregular work schedules (relative to both standard and non-day schedules) with reading skills were estimated as being indirectly associated through cognitive stimulation (BC lower = -.0139, BC upper = .0046; BC lower = -.0001, BC upper = .0230, respectively). In general, these results suggest that mothers who worked

Table 13. Bootstrap Indirect Effects of Mothers' Work Schedules on Children's School Readiness Through Cognitive Stimulation

Model (Pathway)	BC Lower	BC Upper	With Covariates	
			BC Lower	BC Upper
WS → CS → READ				
NDY (STD) → CS → READ	-.0248	-.0071	-.0110	.0001
IRR (STD) → CS → READ	-.0139	.0046	-.0052	.0047
IRR (NDY) → CS → READ	-.0001	.0230	-.0004	.0121
WS → CS → MATH				
NDY (STD) → CS → MATH	-.0250	-.0069	-.0122	.0001
IRR (STD) → CS → MATH	-.0139	.0046	-.0056	.0051
IRR (NDY) → CS → MATH	-.0001	.0238	-.0003	.0139
WS → CS → EXT <sup>1</sup>				
NDY (STD) → CS → EXT <sup>1</sup>	-.0040	.0031	-.0080	.0007
IRR (STD) → CS → EXT <sup>1</sup>	-.0023	.0010	-.0023	.0013
IRR (NDY) → CS → EXT <sup>1</sup>	-.0022	.0036	-.0005	.0056
WS → CS → EXT <sup>2</sup>				
NDY (STD) → CS → EXT <sup>2</sup>	-.0010	.0021	-.0002	.0013
IRR (STD) → CS → EXT <sup>2</sup>	-.0010	.0015	-.0003	.0008
IRR (NDY) → CS → EXT <sup>2</sup>	-.0019	.0002	-.0015	.0002

*Note.* WS = Mothers' work schedules, NDY (STD) = Relative indirect effect of non-day vs. standard schedules, IRR (STD) = Relative indirect effect of irregular vs. standard schedules, IRR (NDY) = Relative indirect effect of irregular vs. non-day schedules, CS = Mothers' cognitive stimulation, READ = Children's early reading skills, MATH = Children's early mathematics skills, EXT<sup>1</sup> = Mothers' reports of externalizing problems, EXT<sup>2</sup> = ECEPs' reports of externalizing problems. Significant indirect effects are in bold.

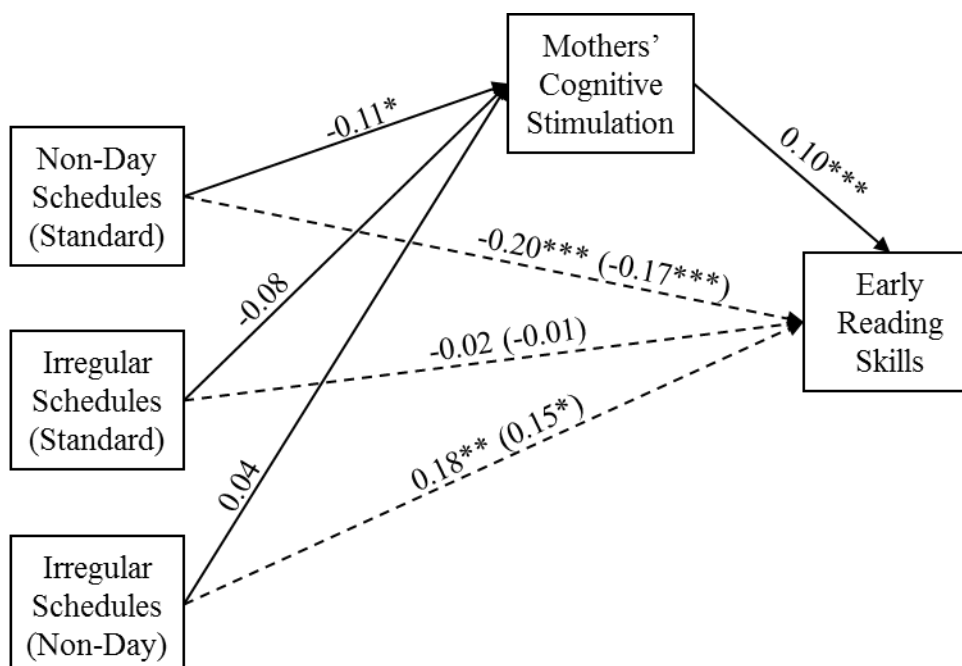
non-day schedules (relative to standard schedules) reported lower mean levels of cognitive stimulation, which was in turn related to children's lower early reading scores.

Results yielded using weighted regression models were consistent with findings from the bootstrapped analyses (see Figure 8), showing that, relative to mothers who worked a standard schedule, mothers who worked a non-day schedule engaged in lower mean levels of cognitive stimulation ( $a_1 = -0.11, p < .05$ ). In contrast, there was not a significant difference between mean levels of cognitive stimulation for mothers who worked an irregular vs. standard schedule ( $a_2 = -0.08, n.s.$ ). Finally, an additional



regression model that used non-day schedules as the reference category found that the mean levels of mothers' cognitive stimulation were not significantly different between mothers working a non-day or irregular work schedule ( $a_3 = 0.04$ , *n.s.*).

Figure 8. Model of Mothers' Cognitive Stimulation Mediating the Link Between Work Schedules and Children's Early Reading Skills



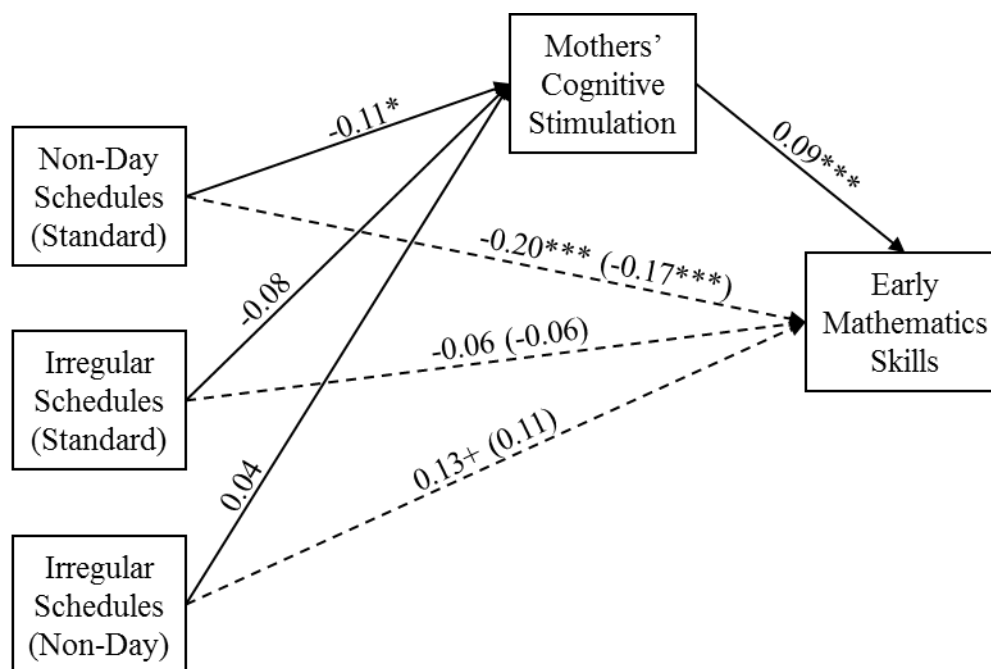
Results from the next regression model indicated that mothers' cognitive stimulation was positively associated with children's early reading skills ( $b = 0.10$ ,  $p < .001$ ). In this instance, findings from the post-hoc Sobel tests were consistent with the finding from the bootstrapped models. However, the relative indirect effect of non-day work schedule (relative to standard) on children's early reading skills was only marginally significant ( $z = -1.99$ ,  $p < .10$ ), which was not in line with the bootstrapped results. In general, these findings indicate that the overall link between mothers' work schedules and children's reading skills is not mediated by cognitive stimulation.

**Early mathematics skills.** For children's early mathematics skills, findings from the bootstrapping analyses indicated that zero was not in the range of the lower and upper limits when the relation between mothers' non-day work schedules (relative to standard work schedules) with children's early mathematics skills was investigated as being mediated by cognitive stimulation (BC lower = -.0250, BC upper = -.0069). On the contrary, no evidence of a mediating effect was found when the associations between mothers' irregular work schedules (relative to both standard and non-day schedules) with reading skills were tested as being mediated by cognitive stimulation (BC lower = -.0139, BC upper = .0046; BC lower = -.0001, BC upper = .0238, respectively). On the whole, these results suggest that mothers working non-day work schedules (relative to standard schedules) reported lower mean levels of cognitive stimulation, which were in turn related to children's lower early mathematics scores.

Results from the weighted regression analyses revealed a pattern of results similar to that seen with children's early reading skills (see Figure 9). Essentially, mothers' cognitive stimulation was found to be positively associated with children's early mathematics skills ( $b = 0.09$ ,  $p < .001$ ), but the post-hoc Sobel test found the relative indirect effect for mothers' non-day schedules (relative to standard) via cognitive stimulation to be only marginally significant ( $z = -1.94$ ,  $p < .10$ ). Moreover, there was no evidence of significant relative indirect effects for irregular schedules when compared to either standard schedules ( $z = -1.94$ , *n.s.*) or non-day schedules ( $z = -1.94$ , *n.s.*). Collectively, these findings demonstrate that mothers' cognitive stimulation does not

serve as a significant mediator of the relation between work schedules and early mathematics skills.

Figure 9. Model of Mothers' Cognitive Stimulation Mediating the Link Between Work Schedules and Children's Early Mathematics Skills

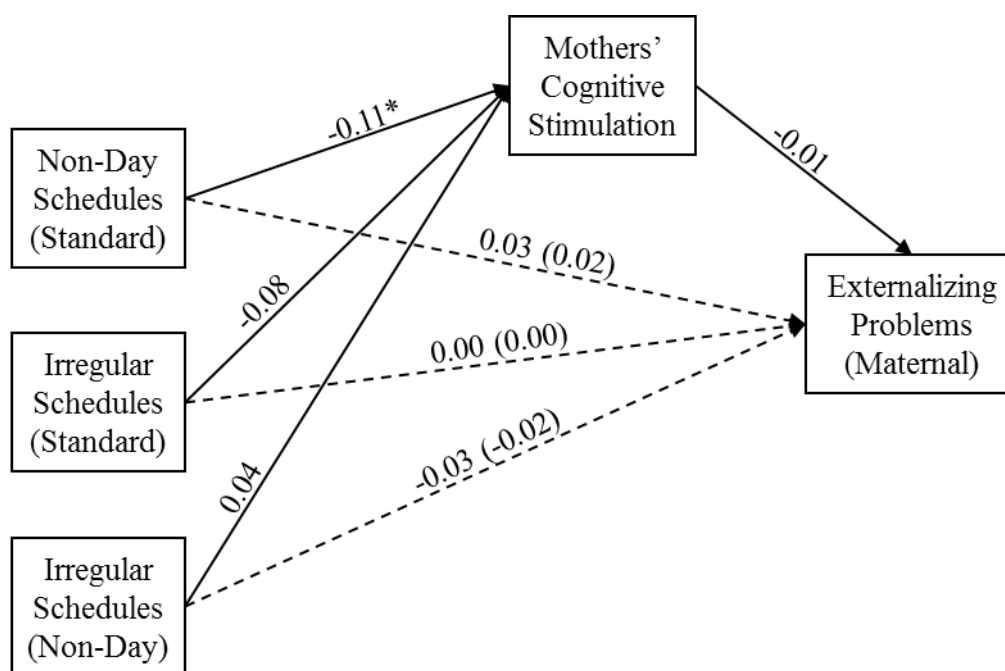


**Mothers' reports of children's externalizing behavior problems.** When testing models predicting mothers' reports of children's externalizing behaviors, there was no evidence for a mediating effect of cognitive stimulation. More specifically, bootstrapped results showed that zero was contained within the lower and upper limits when the associations between mothers' non-day and irregular work schedules (relative to standard work schedules) with children's externalizing problems were examined with cognitive stimulation as a mediator (BC lower = -.0040, BC upper = .0031; BC lower = -.0023, BC upper = .0010, respectively). Additionally, zero did fall between the lower and upper limits when the link between mothers' irregular work schedules (relative to non-day

schedules) with problem behaviors was considered to be indirectly associated through cognitive stimulation (BC lower =  $-.0022$ , BC upper =  $.0036$ ).

Keeping with these findings, the weighted regression models also found no support for the mediating role of cognitive stimulation (see Figure 10). In this set of models, mothers' cognitive stimulation was not significantly related to mothers' reports of children's externalizing behavior problems ( $b = -0.02$ ,  $n.s.$ ). No Sobel tests were conducted in this instance as a significant  $b$  pathway is a necessary component of an indirect effect.

Figure 10. Model of Mothers' Cognitive Stimulation Mediating the Link Between Work Schedules and Mothers' Reports of Children's Externalizing Problems



**ECEPs' reports of children's externalizing behavior problems.** Much like the findings for mothers' reports of problem behaviors, this set of bootstrapped models demonstrated that mothers' cognitive stimulation does not mediate the linkage between

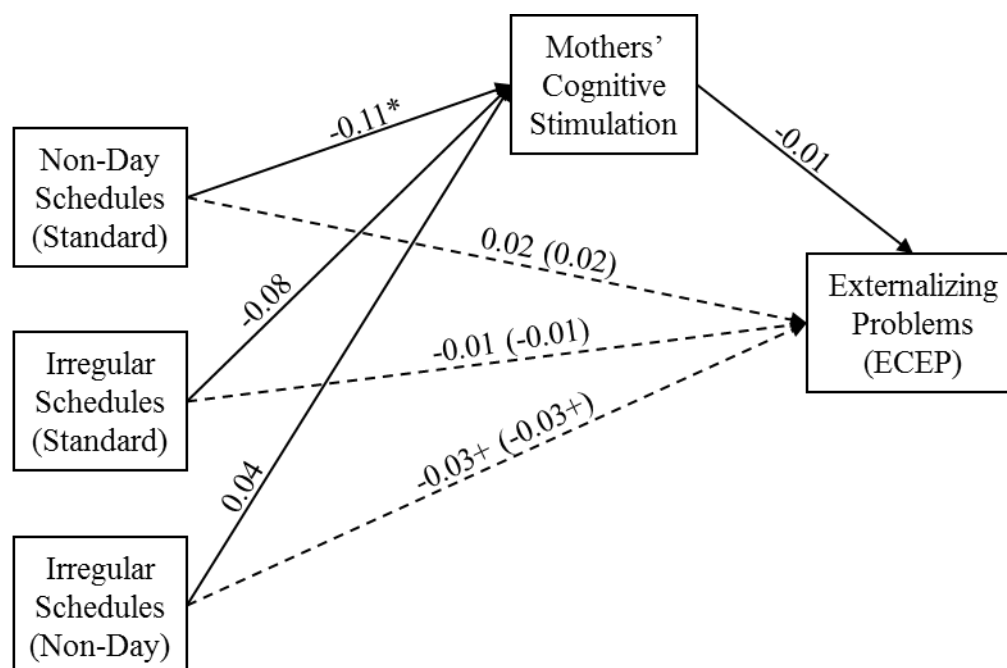
work schedules and ECEPs' reports of behavior problems either. Specifically, there were no significant relative indirect effects when the associations between mothers' non-day and irregular work schedules (relative to standard work schedules) with children's externalizing problems were analyzed as being mediated via cognitive stimulation (BC lower = -.0010, BC upper = .0021; BC lower = -.0010, BC upper = .0015, respectively). Additionally, zero was within the lower and upper limits when the link between mothers' irregular work schedules (relative to non-day schedules) with problem behaviors was examined with cognitive stimulation as a mediator (BC lower = -.0019, BC upper = .0002).

The bootstrapped findings were corroborated by those found with the weighted regression analyses (see Figure 11). Specifically, the non-significant linkage between mothers' cognitive stimulation and children's problem behaviors as reported by ECEPs ( $b = -0.01$ , *n.s.*) suggests the absence of an indirect effect. As such, no further steps were taken.

### **Mothers' Emotional Supportiveness**

After examining the mediating role of mothers' cognitive stimulation, the next research question addressed whether the second indicator of positive parenting was a mediator of the link between mothers' work schedules and children's readiness for school. Specifically, the mediating role of mothers' emotional supportiveness was tested.

Figure 11. Model of Mothers' Cognitive Stimulation Mediating the Link Between Work Schedules and ECEPs' Reports of Children's Externalizing Problems



An approach similar to that used with the last set of analyses was utilized to account for the multiple mediators, whereby cognitive stimulation was controlled for in the models.

Table 14 provides a summary of the bootstrapped effects.

**Early reading skills.** Overall, the findings from both the bootstrapped and regression models estimated to conduct post-hoc Sobel tests where appropriate showed that mothers' work schedules and children's early reading skills were not indirectly associated via emotional supportiveness. In particular, there was no evidence of relative indirect effects when the relations between mothers' non-day and irregular work schedules (both relative to standard work schedules) with children's early reading skills were assessed as being mediated through emotional supportiveness (BC lower = -.0110, BC upper = .0040; BC lower = -.0080, BC upper = .0088, respectively). Additionally,

Table 14. Bootstrap Indirect Effects of Mothers' Work Schedules on Children's School Readiness Through Emotional Supportiveness

Model (Pathway)	BC Lower	BC Upper	With Covariates	
			BC Lower	BC Upper
WS → ES → READ				
NDY (STD) → ES → READ	-.0110	.0040	-.0005	.0053
IRR (STD) → ES → READ	-.0080	.0088	-.0007	.0059
IRR (NDY) → ES → READ	-.0066	.0146	-.0035	.0036
WS → ES → MATH				
NDY (STD) → ES → MATH	-.0091	.0029	-.0005	.0040
IRR (STD) → ES → MATH	-.0064	.0071	-.0005	.0046
IRR (NDY) → ES → MATH	-.0047	.0120	-.0021	.0024
WS → ES → EXT <sup>1</sup>				
NDY (STD) → ES → EXT <sup>1</sup>	-.0010	.0043	-.0034	.0004
IRR (STD) → ES → EXT <sup>1</sup>	-.0034	.0026	-.0037	.0004
IRR (NDY) → ES → EXT <sup>1</sup>	-.0057	.0018	-.0019	.0018
WS → ES → EXT <sup>2</sup>				
NDY (STD) → ES → EXT <sup>2</sup>	-.0001	.0016	-.0007	.0002
IRR (STD) → ES → EXT <sup>2</sup>	-.0009	.0007	-.0010	.0003
IRR (NDY) → ES → EXT <sup>2</sup>	-.0021	.0003	-.0010	.0003

*Note.* WS = Mothers' work schedules, NDY (STD) = Relative indirect effect of non-day vs. standard schedules, IRR (STD) = Relative indirect effect of irregular vs. standard schedules, IRR (NDY) = Relative indirect effect of irregular vs. non-day schedules, ES = Mothers' emotional supportiveness, READ = Children's early reading skills, MATH = Children's early mathematics skills, EXT <sup>1</sup> = Mothers' reports of externalizing problems, EXT <sup>2</sup> = ECEPs' reports of externalizing problems. Significant indirect effects are in bold.

zero was within the range of the lower and upper limits when the association between mothers' irregular work schedules (relative to non-day schedules) with early reading skills was estimated as being mediated by emotional supportiveness (BC lower = -.0066, BC upper = .0146).

Next, the weighted regression models found similar results (see Figure 12).

Relative to mothers who worked a standard schedule, there were no significant differences in mean levels of emotional supportiveness among mothers who worked a non-day schedule ( $a_1 = -0.03$ , *n.s.*) or an irregular schedule ( $a_2 = 0.06$ , *n.s.*). A separate

regression model conducted with non-day schedules as the reference group revealed that mean differences in levels of emotional supportiveness were also not significantly different between mothers working non-day and irregular work schedules ( $a_3 = 0.09$ , *n.s.*). In the absence of any significant *a* pathways, there is no evidence for a mediating effect (Hayes, 2009; Holmbeck, 1997), regardless of a significant *b* pathway. Broadly, these regression results provide consistent evidence that mothers' work schedule were not indirectly related to any of the four school readiness outcomes via emotional supportiveness (see Figures 12-15).

Figure 12. Model of Mothers' Emotional Supportiveness Mediating the Link Between Work Schedules and Children's Early Reading Skills

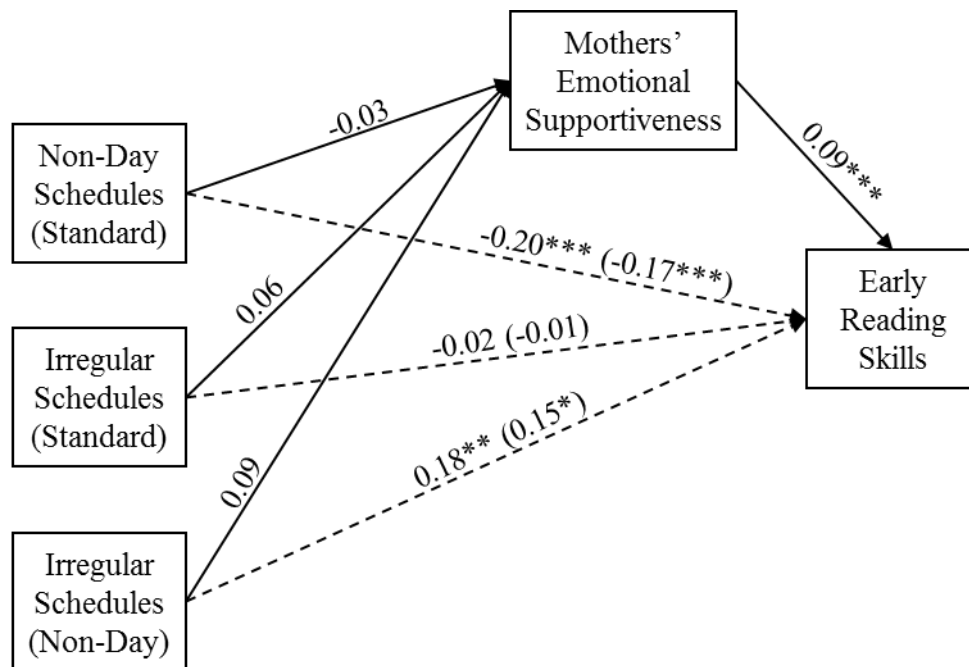




Figure 13. Model of Mothers' Emotional Supportiveness Mediating the Link Between Work Schedules and Children's Early Mathematics Skills

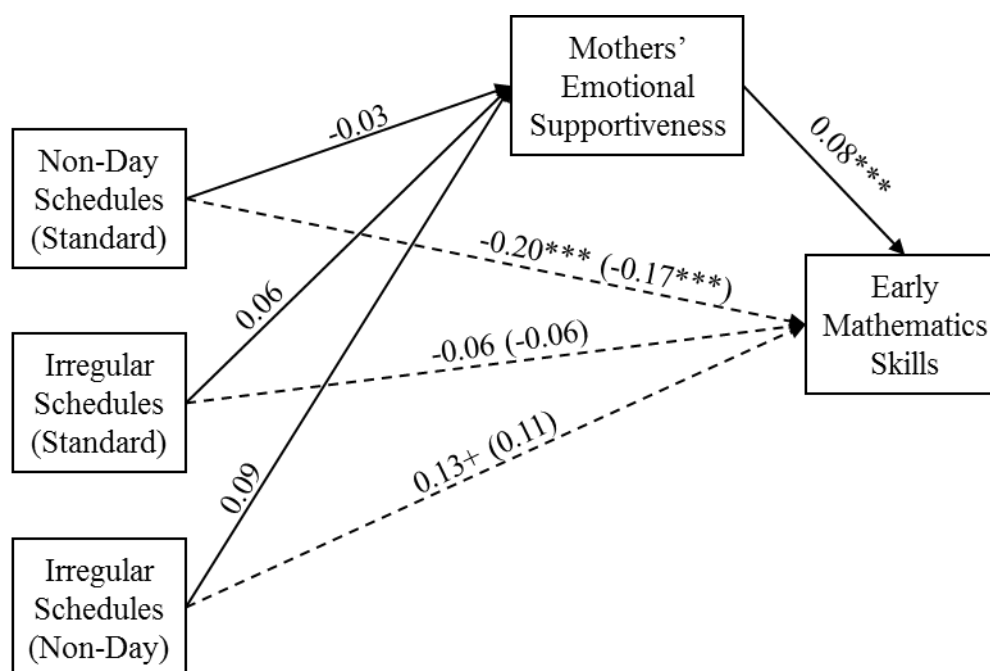


Figure 14. Model of Mothers' Emotional Supportiveness Mediating the Link Between Work Schedules and Mothers' Reports of Children's Externalizing Problems

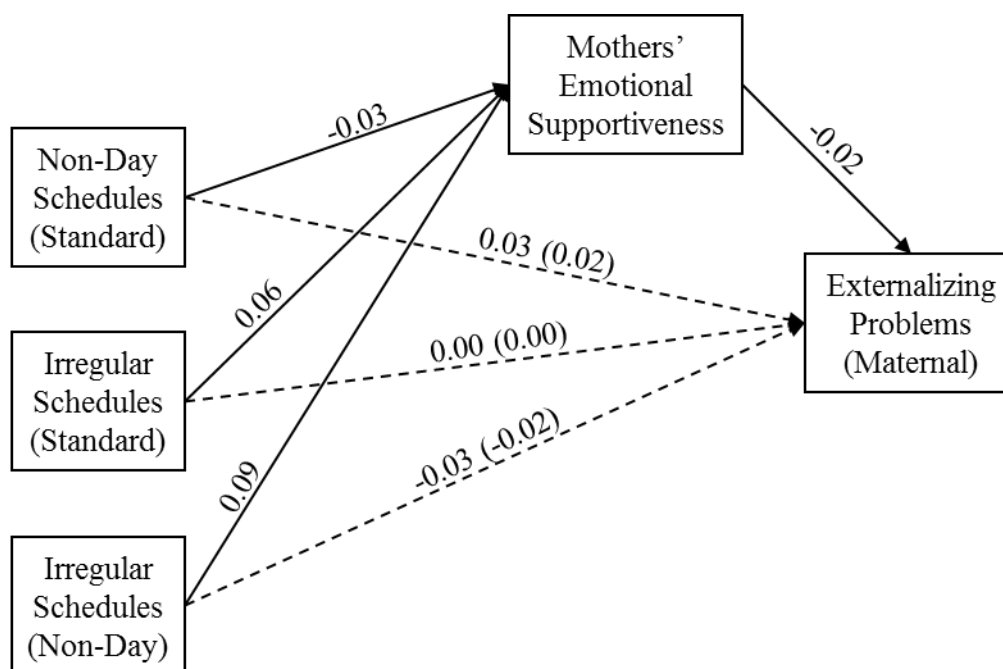
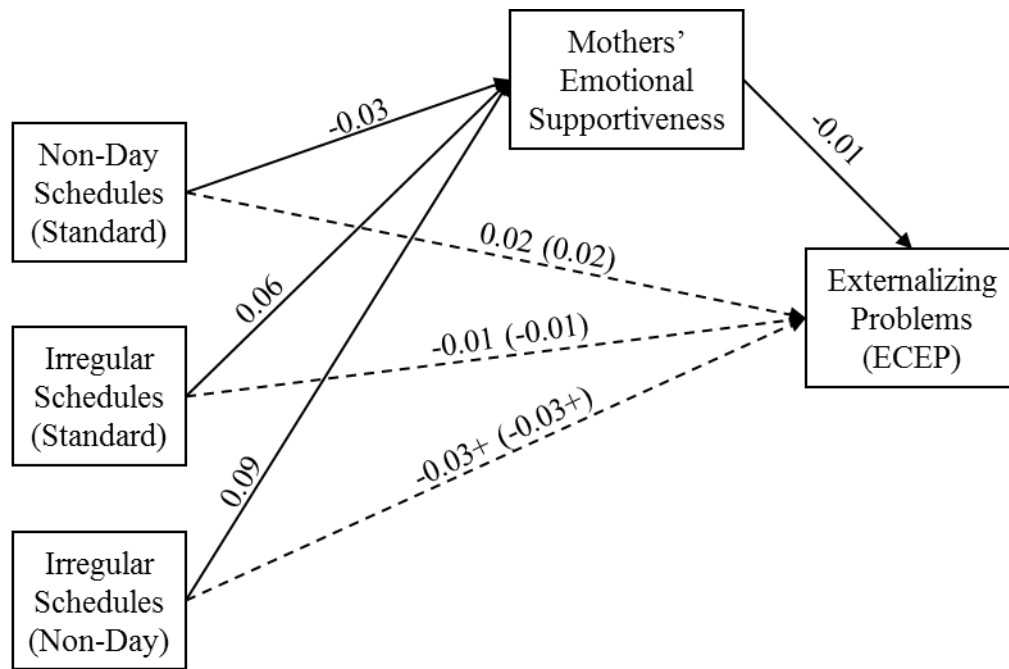


Figure 15. Model of Mothers' Emotional Supportiveness Mediating the Link Between Work Schedules and ECEPs' Reports of Children's Externalizing Problems



**Early mathematics skills.** For children's early mathematics skills, results demonstrated that zero did fall between the lower and upper limits when the linkages between mothers' non-day and irregular work schedules (relative to standard work schedules) with children's early mathematics skills were tested with emotional supportiveness as a mediator (BC lower = -.0091, BC upper = .0029; BC lower = -.0064, BC upper = .0071, respectively). Additionally, the lower and upper limits contained zero when the relation between mothers' irregular work schedules (relative to non-day schedules) with early mathematics skills was thought to be indirectly associated through emotional supportiveness (BC lower = -.0047, BC upper = .0120). Overall, these results suggest that mothers' work schedules are not indirectly associated with children's early mathematics skills via emotional supportiveness.

**Mothers' reports of children's externalizing behavior problems.** Results

indicated that zero was within the range of the lower and upper limits when the associations between mothers' non-day and irregular work schedules (both relative to standard work schedules) with children's externalizing problems were tested with emotional supportiveness as a mediator (BC lower = -.0010, BC upper = .0043; BC lower = -.0034, BC upper = .0026, respectively). Additionally, the lower and upper limits did contain zero when the relation between mothers' irregular work schedules (relative to non-day schedules) and problem behaviors was estimated with cognitive stimulation playing a mediating role (BC lower = -.0057, BC upper = .0018). In sum, these results suggest that mothers' work schedules were not indirectly linked to mothers' reports of children's externalizing behavior problems via emotional supportiveness.

**ECEPs' reports of children's externalizing behavior problems.** With respect to ECEPs' reports of problem behaviors, findings demonstrated that the lower and upper limits included zero when emotional supportiveness was tested as a mediating factor between mothers' non-day and irregular work schedules (both relative to standard work schedules) and children's externalizing problems (BC lower = -.0001, BC upper = .0016; BC lower = -.0009, BC upper = .0007, respectively). Additionally, zero was also contained within the lower and upper limits when emotional supportiveness was thought to indirectly link mothers' irregular work schedules (relative to non-day schedules) and children's problem behaviors (BC lower = -.0021, BC upper = .0003). In general, these results suggest that mothers' work schedules are not indirectly associated with ECEPs' reports of children's externalizing behavior problems by emotional supportiveness.

### **Addition of Covariates**

As a robustness check of the mediation analyses, all models were repeated with the inclusion of child and family characteristics as covariates. After controlling for these variables, mothers' nonstandard work schedules (relative to standard) were still significantly associated with children's school readiness through depressive symptoms (see Table 15), however, none of these findings held up in the weighted regression analyses (see Figures 16-19). Further, above and beyond the covariates, mothers' work schedules were no longer significantly associated with depressive symptoms, cognitive stimulation, and emotional supportiveness as tested via bootstrapping or regression (see Tables 12-14 and Figures 16-27). Overall, these results indicate that after controlling for a host of child and family characteristics, mothers' work schedules were not indirectly linked to children's school readiness through depressive symptoms, cognitive stimulation, or emotional supportiveness.

### **Mothers' Depressive Symptoms and Positive Parenting Practices as Successive Mediators**

The final research question asked whether mothers' depressive symptoms and positive parenting practices successively mediated the association between mothers' work schedules and children's school readiness. That is, do mothers' work schedules pose a risk to depressive symptoms and in turn jeopardize mothers' ability to engage in positive parenting? Then, is the reduction in positive parenting linked to lower early academic skills and increased externalizing behavior problems among preschoolers? To

Figure 16. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and Children's Early Reading Skills, Including Covariates

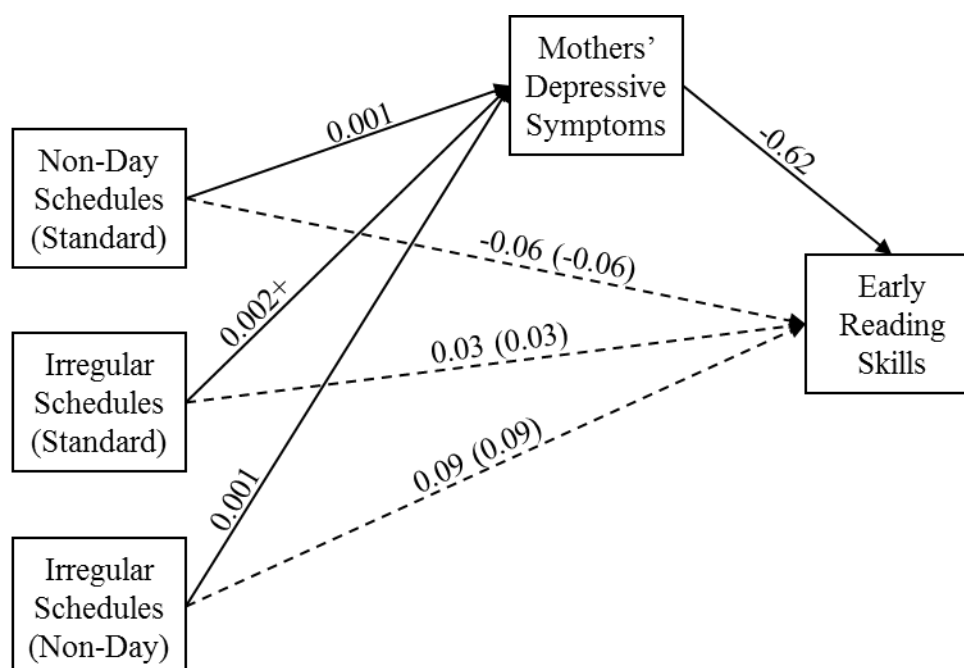


Figure 17. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and Children's Early Mathematics Skills, Including Covariates

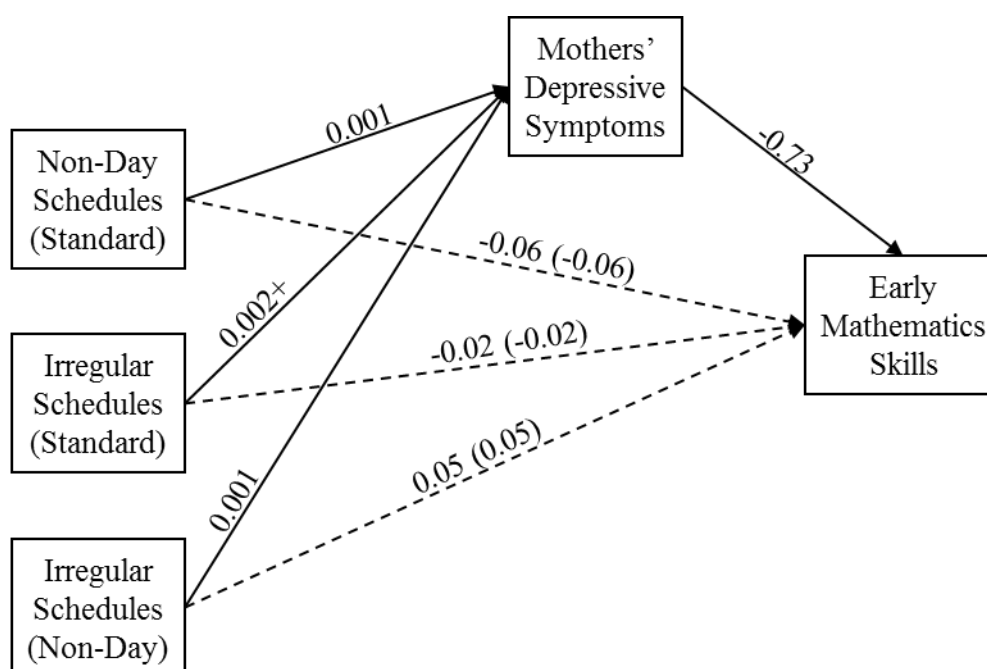


Figure 18. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and Mothers' Reports of Children's Externalizing Problems, Including Covariates

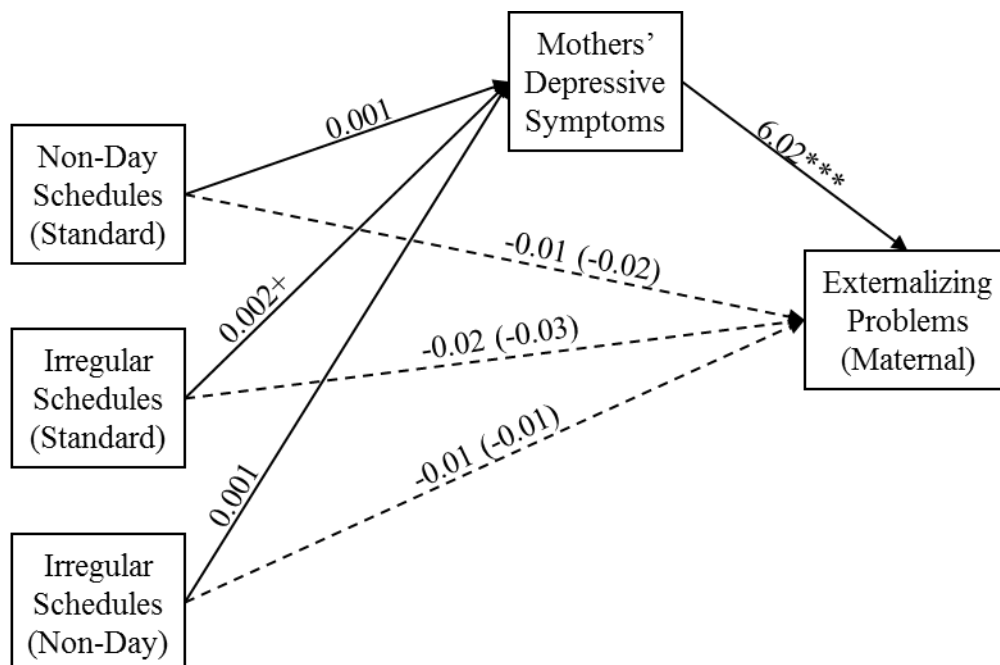


Figure 19. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and ECEPs' Reports of Children's Externalizing Problems, Including Covariates

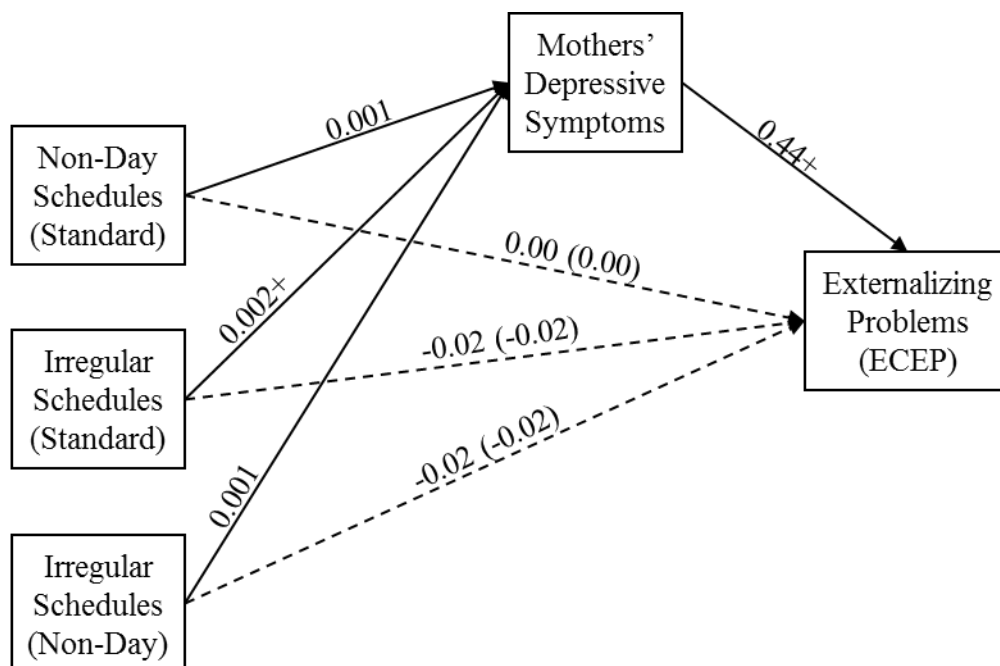


Figure 20. Model of Mothers' Cognitive Stimulation Mediating the Link Between Work Schedules and Children's Early Reading Skills, Including Covariates

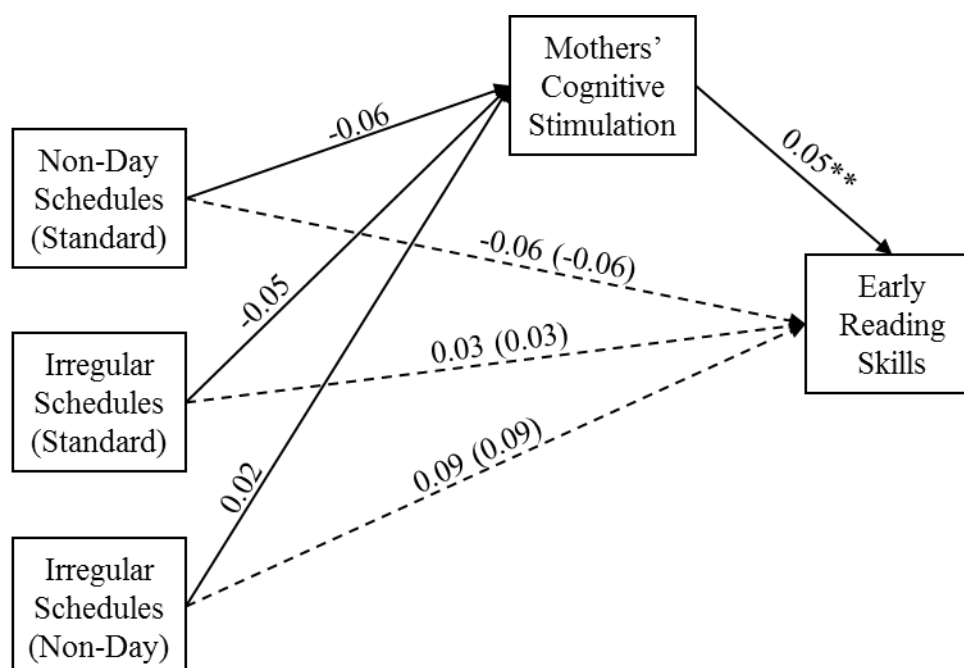


Figure 21. Model of Mothers' Cognitive Stimulation Mediating the Link Between Work Schedules and Children's Early Mathematics Skills, Including Covariates

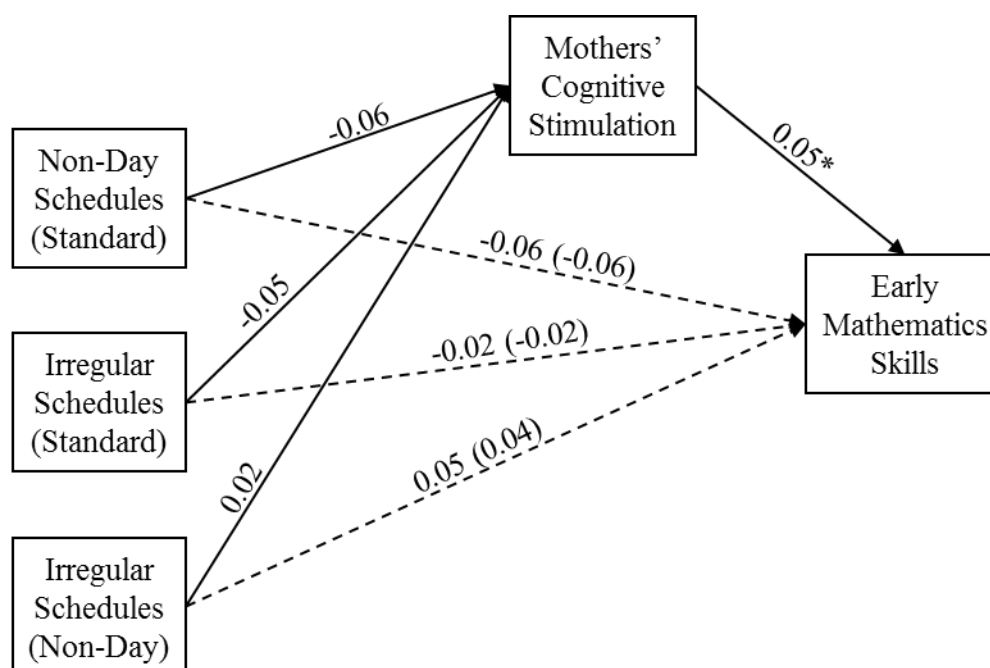


Figure 22. Model of Mothers' Cognitive Stimulation Mediating the Link Between Work Schedules and Mothers' Reports of Children's Externalizing Problems, Including Covariates

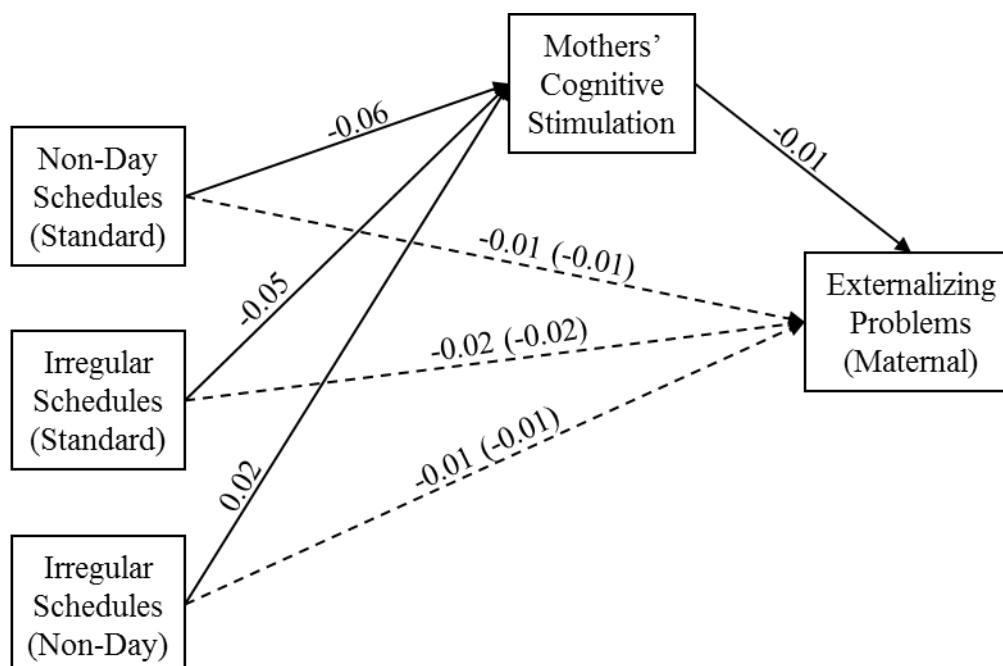


Figure 23. Model of Mothers' Cognitive Stimulation Mediating the Link Between Work Schedules and ECEPs' Reports of Children's Externalizing Problems, Including Covariates

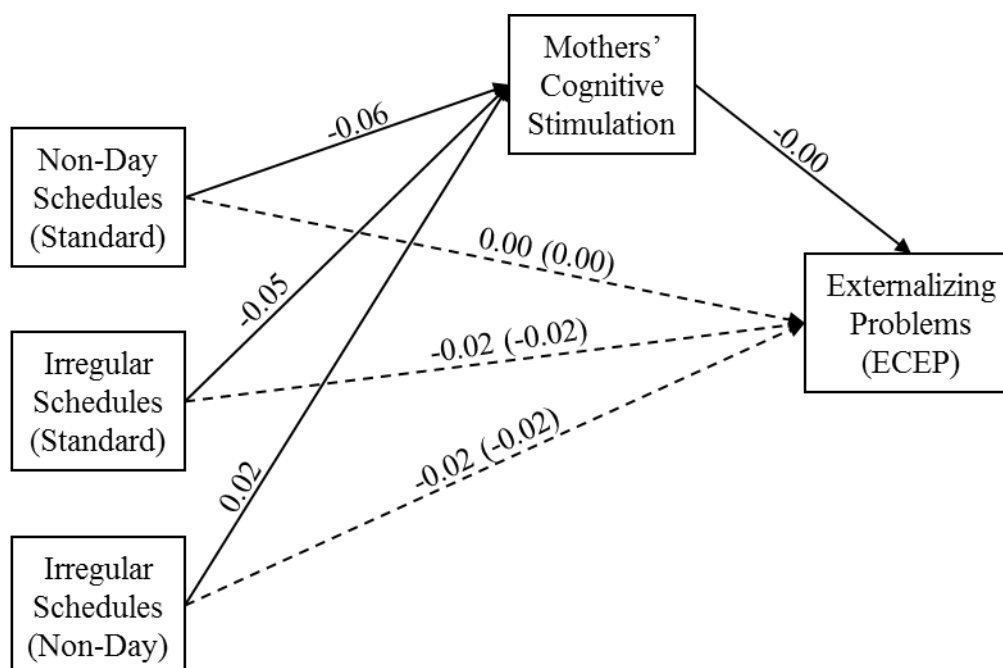




Figure 24. Model of Mothers' Emotional Supportiveness Mediating the Link Between Work Schedules and Children's Early Reading Skills, Including Covariates

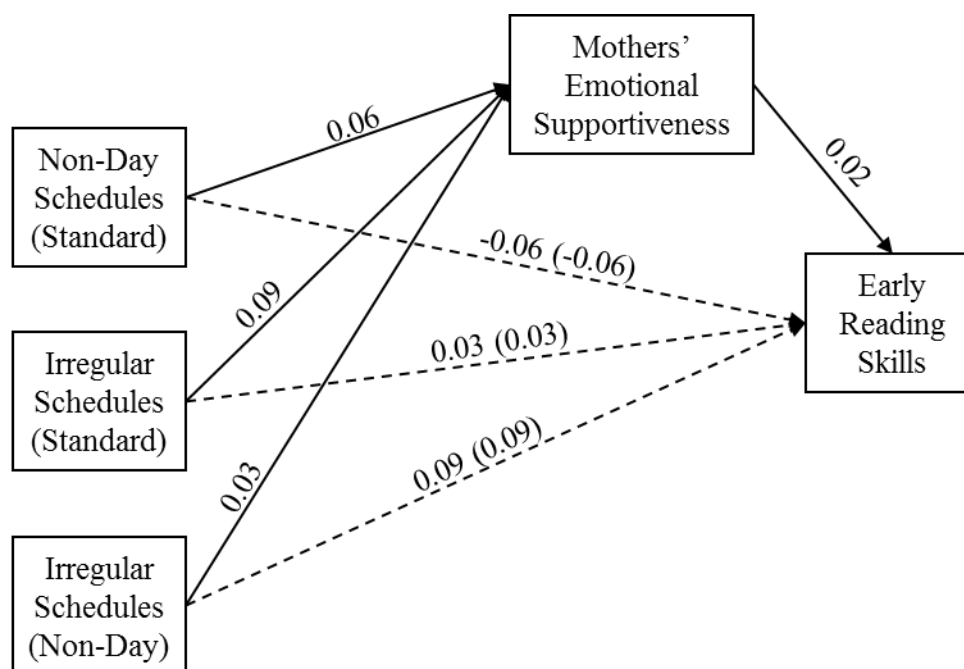


Figure 25. Model of Mothers' Emotional Supportiveness Mediating the Link Between Work Schedules and Children's Early Mathematics Skills, Including Covariates

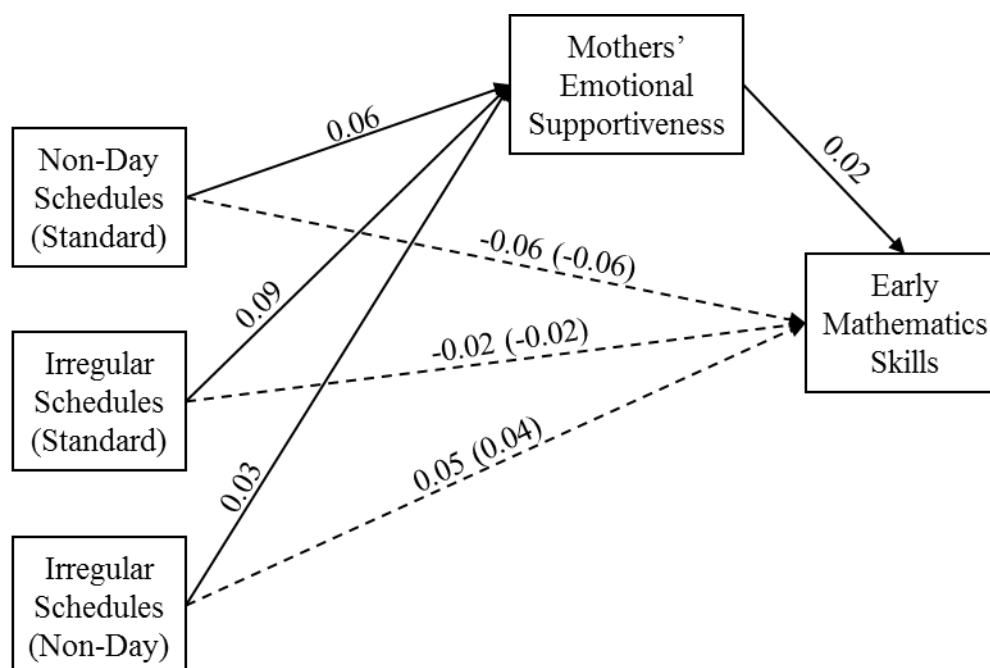


Figure 26. Model of Mothers' Emotional Supportiveness Mediating the Link Between Work Schedules and Mothers' Reports of Children's Externalizing Problems, Including Covariates

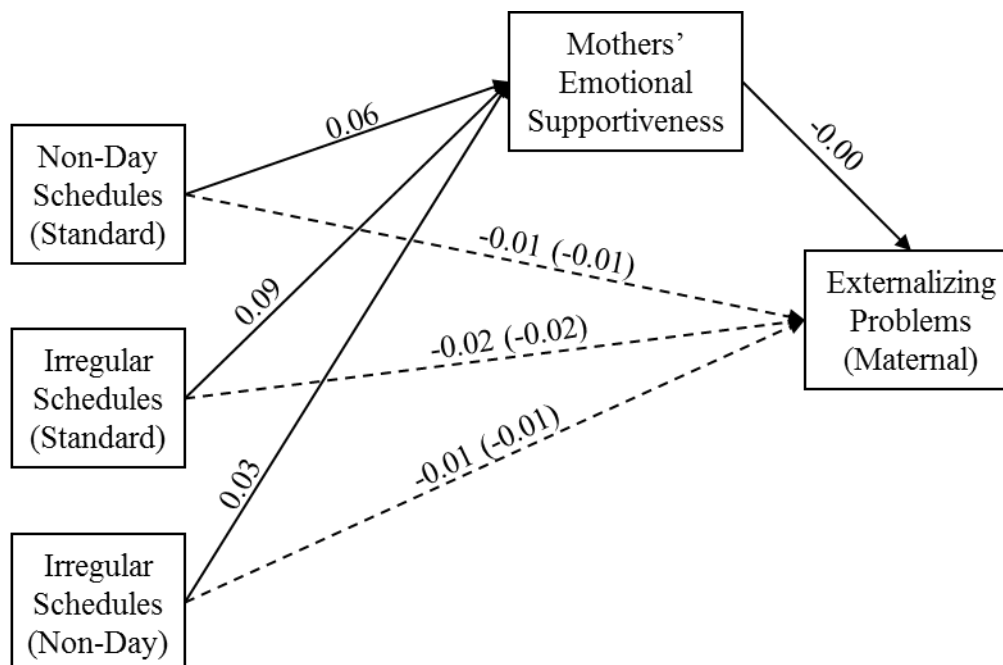
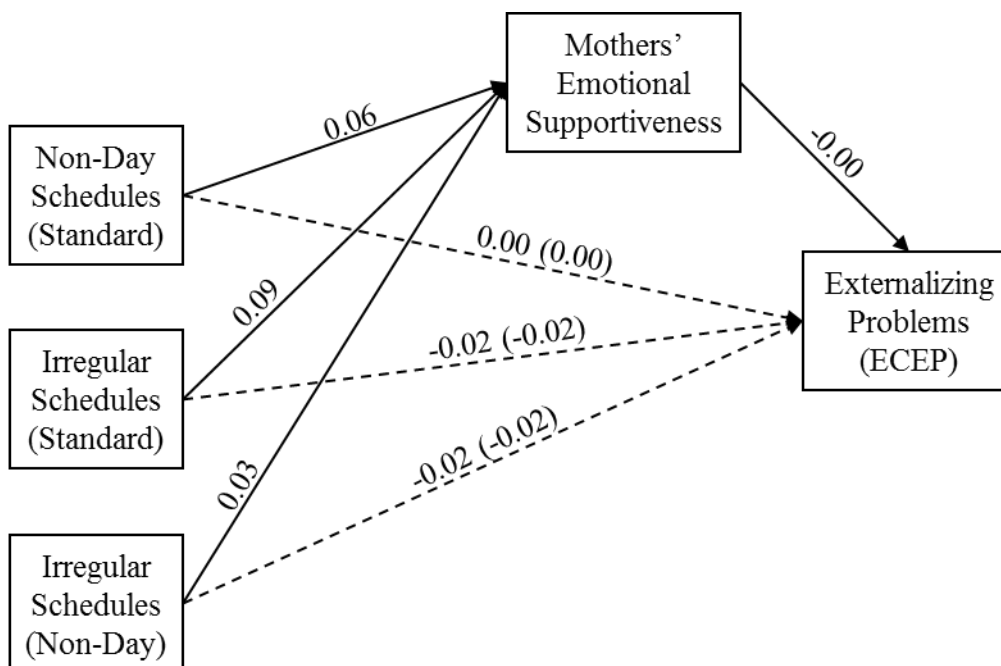


Figure 27. Model of Mothers' Emotional Supportiveness Mediating the Link Between Work Schedules and ECEPs' Reports of Children's Externalizing Problems, Including Covariates



test this question, analyses were conducted to first examine whether mothers' work schedules were indirectly related to positive parenting practices via depressive symptoms.

**Mothers' depressive symptoms.** First, mothers' depressive symptoms were tested as a mediator of the relation between mothers' work schedules and positive parenting practices. Bootstrapped mediation models predicting mothers' cognitive stimulation provided evidence of a mediating effect for both non-day and irregular work schedules (both relative to standard schedules) through depressive symptoms (BC lower = -.0239, BC upper = -.0046; BC lower = -.0217, BC upper = -.0031). In contrast, there was no evidence of an indirect effect between mothers' irregular work schedules (relative to non-day schedules) and cognitive stimulation through depressive symptoms as zero was within the lower and upper bounds (BC lower = -.0053, BC upper = .0119).

A similar pattern of results was found for the indirect link between mothers' work schedules and emotional supportiveness, such that there were significant relative indirect effects for non-day and irregular work schedules (both relative to standard schedules) via mothers' depressive symptoms (BC lower = -.0229, BC upper = -.0046; BC lower = -.0210, BC upper = -.0031). For mothers' irregular schedules as compared to non-day, however, there was no significant finding (BC lower = -.0051, BC upper = .0113). Moreover, the significant relative indirect effects for both outcomes dropped out after the inclusion of child and family characteristics.

Adding to the evidence against mothers' depressive symptoms functioning as a mediator in this linkage, the weighted regression models revealed that mothers' greater depressive symptoms were only marginally related to less cognitive stimulation ( $b = -$

1.88,  $p < .10$ ). Furthermore, in terms of mothers' emotional supportiveness, there was no significant relation with depressive symptoms ( $b = -1.55$ , *n.s.*). Collectively, these results indicate that mothers' work schedules are not indirectly related to positive parenting practices via depressive symptoms, which suggests that depressive symptoms and positive parenting practices do not function as successive mediators of the association between mothers' work schedules and young children's school readiness (see Table 15 and Figures 28-31).

Table 15. Bootstrap Indirect Effects of Mothers' Work Schedules on Positive Parenting Practices Through Depression

Model (Pathway)	BC Lower	BC Upper	With Covariates	
			BC Lower	BC Upper
WS → DEP → CS				
NDY (STD) → DEP → CS	-.0239	-.0046	-.0029	.0055
IRR (STD) → DEP → CS	-.0217	-.0031	-.0028	.0062
IRR (NDY) → DEP → CS	-.0053	.0119	-.0029	.0026
WS → DEP → ES				
NDY (STD) → DEP → ES	-.0229	-.0046	-.0017	.0070
IRR (STD) → DEP → ES	-.0210	-.0031	-.0016	.0077
IRR (NDY) → DEP → ES	-.0051	.0113	-.0031	.0027

*Note.* WS = Mothers' work schedules, NDY (STD) = Relative indirect effect of non-day vs. standard schedules, IRR (STD) = Relative indirect effect of irregular vs. standard schedules, IRR (NDY) = Relative indirect effect of irregular vs. non-day schedules, DEP = Mothers' depressive symptoms, CS = cognitive early CSing skills, ES = Children's early ESematics skills, EXT 1 = Mothers' reports of externalizing problems, EXT <sup>2</sup> = ECEPs' reports of externalizing problems. Significant indirect effects are in bold.

Figure 28. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and Mothers' Cognitive Stimulation

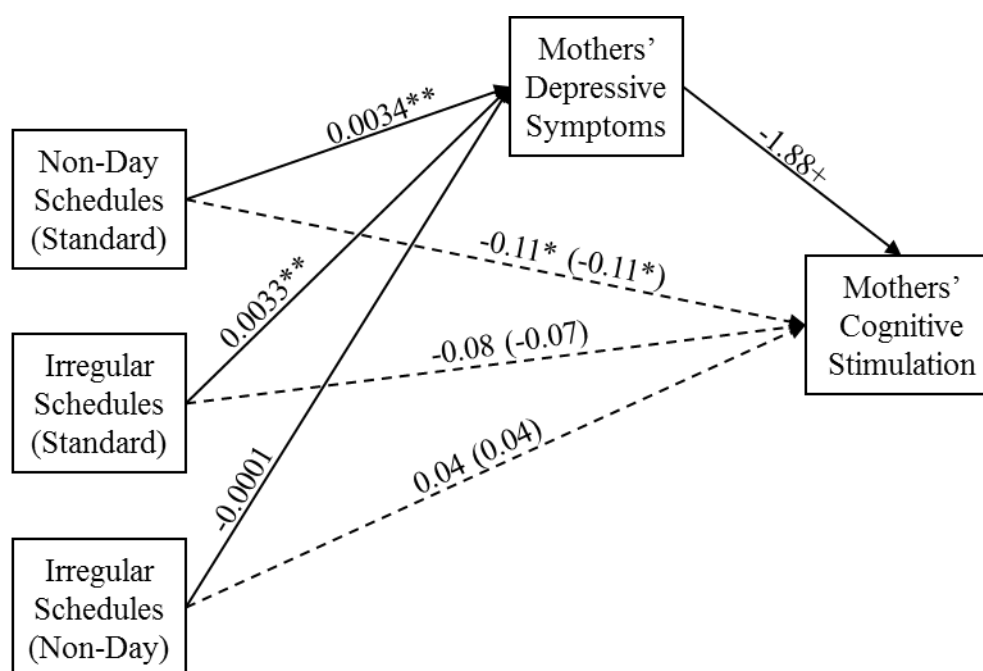


Figure 29. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and Mothers' Emotional Supportiveness

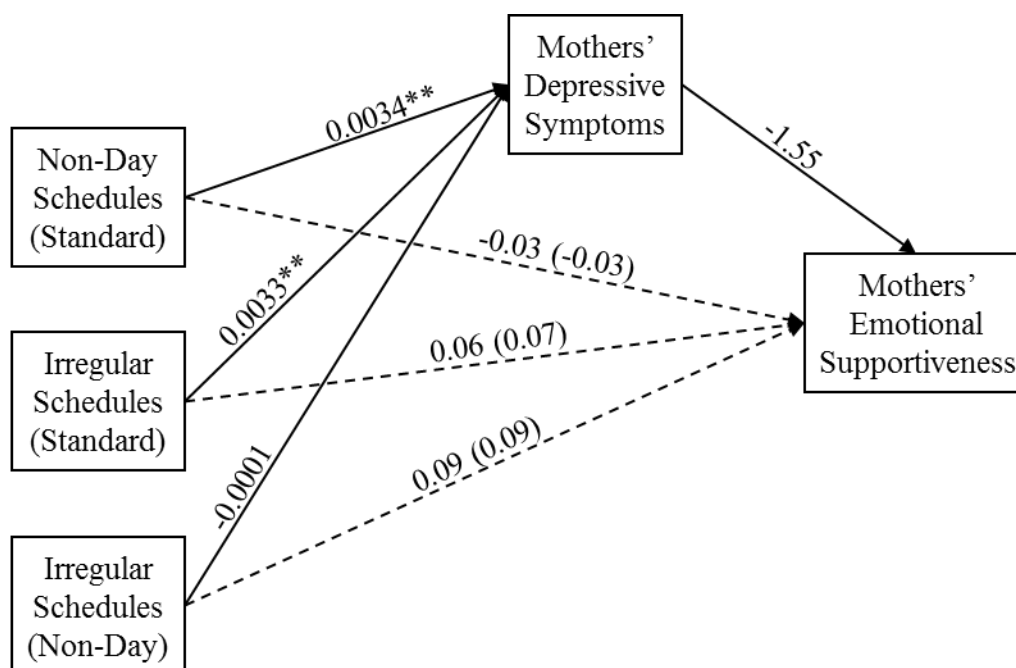


Figure 30. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and Mothers' Cognitive Stimulation, Including Covariates

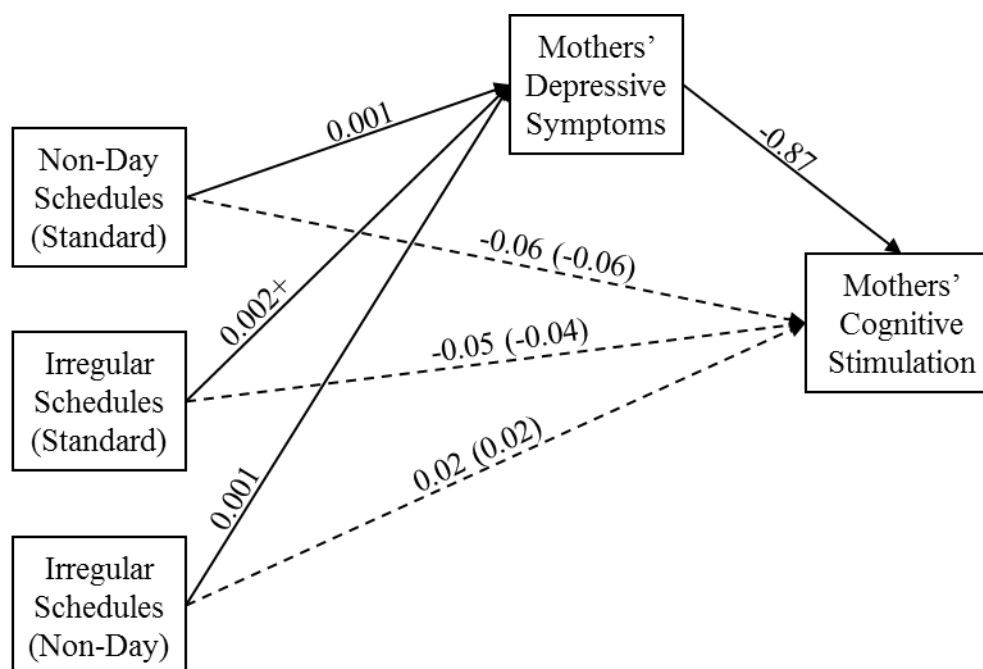
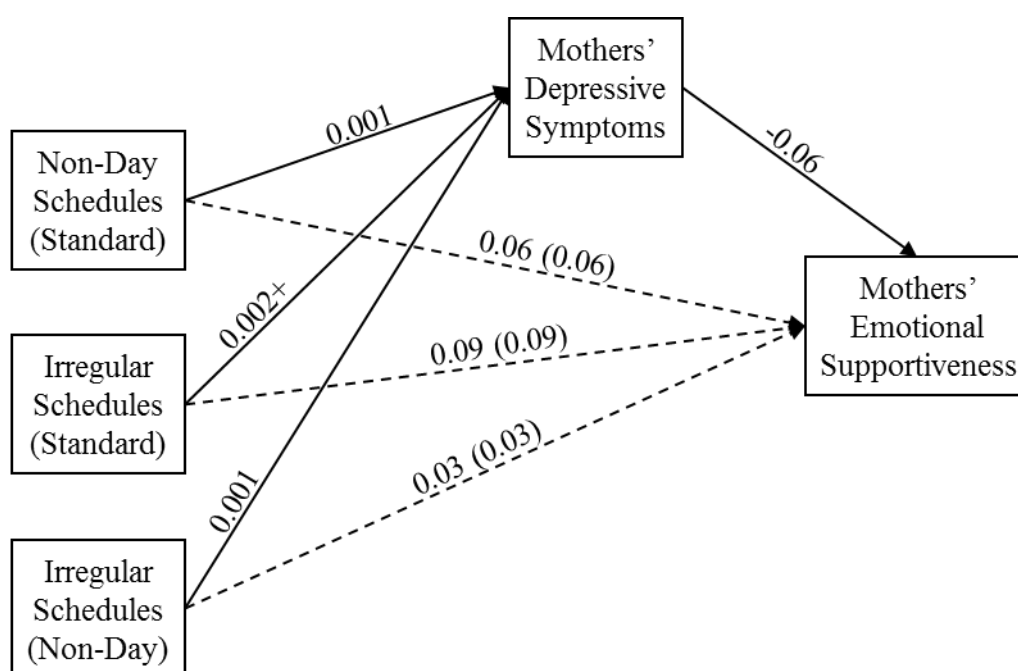


Figure 31. Model of Mothers' Depressive Symptoms Mediating the Link Between Work Schedules and Mothers' Emotional Supportiveness, Including Covariates



## CHAPTER FOUR

### DISCUSSION

As the 24-hour, 7-day-a-week economy becomes more commonplace in the United States, a growing number of mothers are employed during nonstandard hours. For this reason, understanding the influence of such work schedules on young children's well-being has become increasingly important. Despite this, relatively few studies have considered how children's development during early childhood may be shaped by the time of day that mothers work. To address this gap in the literature, the overarching goal of the current study was to examine whether mothers' work schedules were associated with preschool-aged children's readiness for school. Further, this study investigated whether these linkages were conditional on mothers' job and family characteristics, and it examined specific family processes as potential mechanisms underlying this overall relation.

#### **The Role of Mothers' Work Schedules in Children's School Readiness**

Of the limited number of studies that have considered the link between mothers' nonstandard work arrangements and young children's well-being, most have found that such work schedules are negatively related to children's development (e.g., Han, 2005, 2006; Hsueh & Yoshikawa, 2007; Joshi & Bogen, 2007; Rosenbaum & Morett, 2009; Strazdins et al., 2006; but see Dunifon, Kalil, & Bajracharya, 2005; Ross Phillips, 2002). The current study represented a more nuanced approach to this issue by examining how

specific types of nonstandard work schedules may be related to children's readiness for school. Specifically, this study distinguished between two types of nonstandard work schedules (i.e., non-day and irregular) as well as standard work schedules in terms of their association with school readiness. Overall, there were two main effects findings.

First, children's early reading and mathematics skills were lower among children whose mothers worked non-day schedules as compared to those whose mothers worked standard schedules. Though these findings became non-significant with covariates, the bivariate results are congruent with past research (Han, 2005). In general, these findings are in line with those few other studies linking nonstandard work to lower cognitive abilities at 24 months and language skills at 36 months (Han, 2005). Similarly, the current study's findings regarding preschoolers' academic skills were also consistent with other research that reported lower general academic performance among school-aged children of nonstandard workers (Hsueh & Yoshikawa, 2007).

This finding represents a significant contribution to the existing literature as no prior studies have examined mothers' work schedules as they relate to *preschoolers'* early academic skills. This is striking given that preschoolers are particularly dependent on their parents for care, support, and protection, relative to older children (Pettit, Bates, & Dodge, 1997). Consequently, mothers' employment at nonstandard times may be especially salient for young children, particularly when we acknowledge the vast array of skills and capabilities that rapidly develop during the early years of children's lives (Shonkoff & Phillips, 2000). Conjointly, while most of the existing studies have focused on children's socioemotional skills, it is important for research to pursue a better



understanding of individual differences in preschoolers' early academic skills since such skills are predictive of later achievement (Blair & Razza, 2007; Duncan et al., 2007; Hinshaw, 1992). Explanations for the detected association between mothers' work schedules and children's school readiness were explored in the testing of other research questions and are discussed in the mediation section below.

Second, it was surprising to find that children's mean reading scores were significantly lower among children whose mothers worked non-day schedules relative to children whose mothers worked irregular work schedules. Along the same lines, it was not anticipated that emergent academic skills among children of mothers employed in irregular and standard schedules would be virtually the same. Instead, based on previous research, it was expected that the chaotic nature of irregular, rotating schedules would be associated with lower levels of school readiness than children whose mothers worked standard and non-day shifts (Grosswald, 2003).

Though these results became null when including covariates, the bivariate findings raise an interesting issue. Mothers who are employed in irregular, rotating schedules may be buffered against some of the risks associated with shift work by virtue of the fact that they experience more breaks from the late shift hours in their schedules as compared to regular non-day workers (Grosswald, 2003). For example, mothers in irregular shifts may be able to compensate for the disruption in circadian rhythms and sleep deprivation more frequently than mothers who consistently work the night shift. Similarly, on those occasions where mothers employed in a rotating shift are "off" of an

evening/night rotation, they may be able to use that time to make up for the negative physical and social experiences of their night rotation.

Working regularly during late hours may take more of a toll on mothers' physical, psychological, and social well-being than that seen among employees of irregular or rotating schedules. There is a large, well-established body of literature documenting the plethora of risks associated with night shift work (e.g., Akerstedt, 1990; Bohle & Tilley, 1990; Sack, Auckley, Auger, Carskadon, Wright, Vitello, & Zhdanova, 2007). The sleep deprivation and psychological distress associated with these schedules may leave mothers physically and psychologically unwell, and therefore less able to engage in positive interactions with their children (Daniel et al., 2009; Fenwick & Tausig, 2001). In turn, this may be responsible for the lower academic skills found among preschoolers of mothers who work non-day schedules, in comparison to those children whose mothers work irregular shifts.

Additionally, it may be that more economically advantaged mothers are selecting into irregular, rotating schedules by choice. With spouses who earn enough income to support families on their own, more affluent mothers of young children may be able to avoid working standard shifts and work irregular, rotating shifts instead, which leave them with relatively large periods of time to spend with their children (Barnett & Hall, 2007). Indeed, the present study found that children of mothers whose income was in the upper middle and upper income brackets (as compared to those in the low-income brackets) showed higher early academic skills and lower externalizing problems.

Moreover, when controlling for income, linkages between mothers' work schedules and children's school readiness became non-significant.

As such, future research should investigate how much choice in mothers' work arrangements and income play a role in children's school readiness. Evidence from the broader employment literature suggests that employees with greater autonomy and decision latitude in the workplace experience less work spillover into the home (Grywacz & Marks, 1999). Thus, it could be that children with mothers who have greater choice demonstrate higher levels of school readiness. However, it does not appear that such choice has been investigated in studies on mothers' nonstandard work schedules.

Third, contrary to my expectations, there was no evidence of a link between mothers' work schedules and preschoolers' externalizing symptoms. Although a negative linkage between nonstandard work schedules and externalizing behavior was expected, these findings are not wholly inconsistent with previous research, which has been mixed. A closer look at these studies shows that significant associations have not been detected in other research (Han, 2006; Hsueh & Yoshikawa, 2007). However, studies on low-income families have found a negative relation between mothers' nonstandard work hours and preschoolers' externalizing behaviors (Joshi & Bogen, 2007). After controlling for income in the present study, work schedules were not linked to behavior problems, suggesting that overall, families' income matters more for externalizing problems than mothers' work schedules. It still could be that the combination of low income and a nonstandard schedule is particularly harmful for children as the Joshi and Bogen (2007) study suggests, but because low-income mothers

are more likely to work nonstandard shifts, that hypothesis could not be tested in the present investigation.

### **The Moderating Roles of Mothers' Job and Family Characteristics**

Another major goal of the current study was to examine whether the linkages between mothers' work schedules and children's school readiness are universal or if they vary by mothers' job and family characteristics. Earlier work has highlighted the multifaceted nature of mothers' work experiences and stressed the importance of considering the relation between work experiences and children's well-being across various sociodemographic contexts (Han, 2006; Hoffman & Youngblade, 1999). To address these issues, this study investigated whether the association between mothers' work schedules and children's school readiness depended upon mothers' work hours and family structure.

There were two significant interaction effects across all four school readiness outcomes and two moderators. Although only one of the interaction effects remained significant when controlling for child and family characteristics, both point our attention again to mothers who work irregular shifts. Specifically, the significant interaction between mothers' work schedules and work hours demonstrated that the negative association between mothers' employment in an irregular work schedule (relative to a standard schedule) was more pronounced when mothers worked more hours each week. The moderating role of family structure functioned such that there was even more of a positive linkage between family structure and children's mathematics skills when mothers worked irregular hours (as compared to standard hours). These findings provide

support for the hypothesis that there may be something especially difficult about managing a rotating, irregular work schedule (Grosswald, 2003). For example, when combined with longer work hours or the absence of a spouse to help with caregiving responsibilities, the ever-changing and chaotic nature of irregular schedules may leave mothers feeling stretched too thin, and in turn, less able to interact with their children in nurturing and supportive ways.

It may be that when mothers work irregular, rotating schedules for fewer hours, they are buffered against some of the difficult aspects of such work schedules. In particular, these mothers likely have more flexibility with their time, which reduces their conflict between work and home as they feel more capable of managing the demands of both spheres of their lives. This finding is congruous with the broader maternal employment literature, which has found that part-time employment may offer more benefits to mothers in the form of reduced work conflict (Buehler & O'Brien, 2011). Similarly, the rotating nature of their jobs allows them to schedule family events around their work schedule, and vice versa. Qualitative studies have shown that mothers working such part-time rotating schedules were afforded more time for caregiving and paternal activities, such as taking their children to appointments (Yoshikawa, Weisner, & Lowe, 2006).

Why was no other support found for differences across mothers' work hours and family structure? It may be that the contexts of more work hours and the absence of a spouse among nonstandard workers pose more of a risk to children's well-being when children are infants, who are more reliant on their mothers for care, support, and

protection. Preschool-aged children, such as those included in this study, may be buffered against the potentially negative effects of both family structure and mothers' work hours, by their time in other contexts, such as child care. Indeed, existing research in the broader maternal employment literature has frequently found that negative associations between mothers' employment and children's well-being only exist during the first year (e.g., Berger et al., 2005; Brooks-Gunn et al., 2010; Hill et al., 2005; Ruhm, 2004, 2009). Future studies should examine work hours and family structure as moderators of that association among infants.

### **The Mediating Role of Mothers' Depressive Symptoms and Positive Parenting Practices**

To better understand mothers' nonstandard work experiences and their contribution to young children's readiness for school, it is important for research to investigate the underlying processes responsible for the relation between these constructs. Therefore, the current study tested mothers' depressive symptoms along with two indicators of positive parenting practices (i.e., cognitive stimulation and emotional supportiveness) as mediators of the link between mothers' work schedules and children's school readiness. Consistent with expectations, support was found for the hypothesis that mothers' depressive symptoms partially explained the overall link of interest. On the contrary, essentially no support was found for the mediating roles of mothers' cognitive stimulation and emotional supportiveness.

The findings for mothers' depressive symptoms are consistent with the few existing studies that have identified mothers' depressive symptoms as a key underlying

mechanism among samples of infants and school-aged children (Daniel et al., 2009; Han, 2005; Rosenbaum & Morett, 2009; Strazdins et al., 2004, 2006). This study is the first to date, however, to consider mothers' depressive symptoms as a mediator of the link between specific types of work schedules and preschoolers' early academic skills and externalizing problems. Below, possible explanations for the association between mothers' depressive symptoms and children's well-being are discussed.

The significant findings regarding mothers' depressive symptoms are of particular note given that the vast majority of mothers in this study reported very low levels of depressive symptoms. These mild, "subthreshold" symptoms of dysphoria include the same symptoms as seen with a clinical diagnosis of major depression, but they do not meet the total number of symptoms and/or length of experience of the symptoms necessary for diagnosis (West & Newman, 2003). The findings in the current study add to the small existing literature suggesting that even mild, non-clinical levels of depressive symptoms may have a salient influence on children's well-being (Angst, Merikangas, & Preisig, 1997; West & Newman, 2003).

While both types of mothers' nonstandard work schedules were indirectly related to children's well-being via depressive symptoms as compared to standard schedules, no support was found for the expectation that irregular work schedules would be more strongly associated with depressive symptoms, and in turn, school readiness than non-day schedules. Unexpectedly, the main effect finding from the current investigation suggests that mothers working irregular shifts may be beneficial for children in some way, relative to non-day schedules. It may not be the case that having lower depressive symptoms

explains this advantage. Rather, it may be that positive experiences related to mothers being able to make a choice regarding irregular shifts that helps children (Barnett & Hall, 2007). Furthermore, working irregular vs. non-day shifts may increase mothers' feelings of autonomy and time spent with children. For example, the *New Hope Ethnographic Study (NHES)* found that working nonstandard schedules allowed some mothers to financially support their families without governmental assistance and allowed them to spend more time with their children (Hsueh & Yoshikawa, 2009). The positive aspects of such experiences might outweigh the negative aspects of working nonstandard work hours. However, no study to date has examined how risks and benefits may be similar or different across various types of nonstandard workers.

With respect to mothers' positive parenting practices, the absence of any evidence linking mothers' work schedules indirectly to children's school readiness via cognitive stimulation or emotional supportiveness was unexpected. These findings were inconsistent with the two studies that have considered positive parenting practices previously, though they utilized samples with younger children (Grzywacz, Daniel, Tucker, Walls, & Leerkes, 2011; Heymann & Earle, 2001; but see Barnett & Gareis, 2007). It may be the case that the challenges associated with working nonstandard schedules may be more strongly linked to negative parenting practices such as harsh punishment and inconsistent discipline, which was found by a study of school-age children's externalizing problems (Strazdins et al., 2006). Future research should consider the roles of both positive and negative aspects of parenting to test this idea explicitly.



Another explanation for the absence of a significant indirect effect through cognitive stimulation or emotional supportiveness is that there are alternative explanatory mechanisms linking work schedules and children's well-being. It is possible that the hardships associated with nonstandard work may be better explained by the frequency of direct contact between mothers and children (Lyons-Ruth, Wolfe, Lyubchik, & Steingard, 2002) or establishment of positive family routines (Fiese, Tomcho, Douglas, Josephs, Poltrock, & Baker, 2002; McLoyd et al., 2008). Future research is needed to test each of these possibilities to further understanding of the processes underlying the relation between mothers' work schedules and children's well-being.

Furthermore, no support was found for the role of mothers' depressive symptoms and positive parenting practices as successive mediators of the link between nonstandard work and school readiness (i.e., mothers' work schedules → depressive symptoms → positive parenting practices → children's school readiness). Yet, it was found that mothers' work schedules were indirectly related to children's adjustment through depressive symptoms. If positive parenting practices do not explain this association, then what mechanisms do?

According to spillover theory, mothers' experiences at work influence their emotions, moods, stress, and behaviors, which are then carried over into their family lives (Belsky, Perry-Jenkins, & Crouter, 1985; Crouter, Bumpus, Maguire, & McHale, 1999; Frone, Yardley, & Markel, 1997; Galambos, Sears, Almeida, & Kolaric, 1995; Lambert, 1990; Repetti, 1987; Stewart & Barling, 1996). Mothers' depressive symptoms may lead

to increased marital conflict, which may, in turn, negatively shape children's well-being (Daniel et al., 2009; Goldberg & Easterbrooks, 1984).

Finally, it is important to keep in mind that the main effects, interaction effect, and virtually all mediation findings became null when adding covariates. At the same time, the bivariate findings raise interesting questions about the experiences of mothers working irregular, rotating schedules. Further, the rigorous statistical methodology used in this study may have resulted in overcontrolled models. This possibility is discussed in greater detail below.

### **Limitations**

While the current study made several contributions to the existing literature, it is important to acknowledge its limitations as well. In particular, the measurement of mothers' cognitive stimulation and emotional supportiveness may not have adequately captured mothers' positive parenting practices. Scores for both of these indicators of parenting were assigned by trained assessors who watched 10 minute video clips of mothers interacting with their children during a structured play activity. While the use of an objective observer was a strength of the measure, the scores were based on interactions that took place over a very brief period of time. One avenue for future research would be to supplement observations of parent-child interaction during structured tasks with a measure such as the Home Observation for Measurement of the Environment (HOME; Bradley, 1993), which provides a more descriptive rating of the quality and quantity of stimulation and support available to children in their home environments.

Moreover, these findings were cross-sectional in nature, and therefore the possibility of simultaneity bias exists as the predictors and outcomes were measured at the same time. While no study has yet investigated how children's adjustment or mothers' depressive symptoms may relate to mothers' work schedules, other research has used transactional models to link children's adjustment difficulties to mothers' increased depressive symptoms (Gross, Shaw, Moilanen, 2007). Future studies should utilize longitudinal data with three or more time points to gather more evidence in support of the indirect linkage through depressive symptoms, with work schedules measured at the earliest wave, depressive symptoms captured at the following wave, and child adjustment assessed in the last wave. Additionally, in the absence of long-term data, it is not possible to test for the potential of sleeper effects (Maurer, Mondloch, & Lewis, 2007), where mothers' earlier work schedules may matter for children's well-being in middle childhood and beyond.

Another limitation of the current study was the use of listwise deletion to handle missing data. Generally, the major concern with listwise deletion is that sample size is greatly reduced because all cases with missing data are deleted. The result of this reduction in sample size is a loss of statistical power in testing hypotheses (Allison, 2009). Additionally, if the data are not missing completely at random, listwise deletion may introduce bias into the parameter estimates (Allison, 2000).

Also, controlling for numerous child and family characteristics in additional analyses may represent another limitation of this study. Initially, the purpose of these additional models was to reduce the potential for omitted variable bias by statistically

controlling for background variables that were theoretically and empirically related to mothers' work schedules and children's school readiness. After the inclusion of these covariates, however, almost none of the significant findings relating to mothers' nonstandard work schedules continued to be significant. On one hand, it is possible that these findings are accurately estimating the true, non-significant relation between mothers' nonstandard work schedules and children's early academic skills and externalizing behaviors. Another possibility is that in these models, the control variables actually "control too much" (Newcombe, 2003).

Newcombe (2003) contends that when trying to understand complex developmental issues, many constructs are likely interrelated and causality is difficult to ascertain. As a result, she argues that if our ultimate goal is to understand the lives and experiences of families in the real world, not all factors that initially seem confounding should be statistically controlled. In doing so, misleading findings may be yielded as the analyst has statistically removed the influence of a variable that cannot be controlled for in real life. The issue then becomes how to balance this concern with the benefits of including covariates which help to better estimate a causal pathway. As a next step, a future study should pursue this issue more fully by testing it empirically. One way of doing so would be to add the control variables in a stepwise fashion. The variables could be grouped in theoretically and empirically meaningful categories (e.g., child vs. family characteristics), and then added to the models successively to test which predictors matter when.

## **Conclusions and Policy Implications**

To the best of my knowledge, this is the first study to use a large scale, nationally representative dataset to consider the role of specific types of nonstandard work schedules in preschoolers' early academic skills and externalizing problems. Moreover, this dissertation utilized a more rigorous statistical methodology than most of the existing research. Contrary to my hypotheses, the results from this dissertation are not wholly consistent with my *a priori* expectations. As hypothesized, there was some support for the relation between mothers' work schedules and children's early reading and mathematics skills. Out of numerous models, there were only two significant interaction effects by mothers' work hours and family structure. Additionally, mothers' work schedules were found to be indirectly linked to children's school readiness through their depressive symptoms, though this finding did not persist above and beyond the inclusion of covariates.

Overall, the results yielded from this study found no support for the link between mothers' work schedules and young children's externalizing symptoms. Moreover, this association was not found to differ by mothers' work hours or family structure. Similarly, among the indirect effects tested in this study, mothers' positive parenting practices (i.e., cognitive stimulation and emotional supportiveness) did not explain the relation between work schedules and children's school readiness.

In conclusion, the limited evidence of a negative association between mothers' nonstandard work schedules and young children's school readiness is reassuring given the ever-increasing number of mothers employed in such work hours. This finding

contributes to the mixed literature on nonstandard schedules, where some research has failed to find compelling evidence for a negative relation (Han, 2006; Hsueh & Yoshikawa, 2007; Ross Phillips, 2002), while other studies have. Furthermore, these results are consistent with the broader maternal employment literature, which has reported few, if any, negative associations with children's development past the first year of life (e.g., Berger et al., 2005; Brooks-Gunn et al., 2010; Hill et al., 2005; Ruhm, 2004, 2009).

Importantly, though this study did not provide overwhelming evidence for the detrimental association between mothers' nonstandard work schedules and children's well-being, there were signs that working part-time, irregular schedules may be beneficial for children. More research is needed on this subset of nonstandard workers and their families, but this study speaks to the possible benefits of increasing options and flexibility for working parents. In comparison to other industrialized nations, public policies such as paid parental leave and flextime are still the exception rather than the rule in the U.S. (Waldfogel, 2006a, 2006b). Research has found that longer periods of paid leave for parents has been linked to better health outcomes among young children (Ruhm, 2000), suggesting that increased acceptance of such policies in the U.S. might lead to benefits for children's academic and social skills (Brooks-Gunn et al., 2010; Waldfogel, 2006b). At the same time, the tension between availability and affordability for any of these policies creates many challenges that we as a nation have only begun to address.

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## VITA

Kelly Haas attended Millikin University in Decatur, Illinois where she graduated Summa Cum Laude in 2007 with a Bachelor's of Science in Psychology and Sociology. She then continued her education by attending graduate school at Loyola University Chicago, where she received both a Master's and Ph.D. in the Developmental Psychology program. While at Loyola, Dr. Haas was awarded multiple fellowships, including the Advanced Doctoral Fellowship as well as the Child and Family Research Assistantship. Her research interests include mothers' employment experiences and young children's academic and socioemotional well-being, as well as the mechanisms and contexts underlying those linkages.